CHAMBERS'S
SCHOOL DICTIONARY

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FOREWORD

The aim of the compilers of this dictionary has been to include all words which are likely to be met with in the course of ordinary reading. Accordingly, the work comprises some 20,000 words which are fully defined, and nearly 10,000 more the meanings of which follow readily from the definitions given in the main headings. It has not been judged necessary, in view of space limitations, to give adverbial and other derivatives which present no difficulty.

The definitions have been made as simple as accuracy allows. In a great many instances common usage is indicated by illustrative examples; in addition, many idiomatic phrases have been given; these are to be found under the heading where they are most likely to be sought.

Most of the words have their pronunciation indicated by respelling in accordance with the system detailed on page iv. In the case of many words respelling would be superfluous to anyone acquainted with the elements of English pronunciation; such words, however, have their accentuation marked, frequently with an indication of vowel-length.

The Appendix at the end of the volume gives (*a*) a table of the principal parts of over 200 verbs which, by reason of irregularity in conjugation or complexity of spelling, often give trouble in writing; (*b*) the more common prefixes, suffixes, and roots (with meanings and examples), abbreviations and contractions, foreign phrases, etc.

PRONUNCIATION

Pronunciation is indicated according to the following system :

	Sound	Example	Pronunciation
ā	as in date	reign	rān
a	as in cat	naphtha	naf′tha
ah	as in ah!	calm	kahm
aw	as in saw	halter	hawlt′er
ē	as in even	chief	chēf
e	as in met	meadow	med′ō
ī	as in mine	isle	īl
i	as in pit	liquid	lik′wid
ō	as in go	ochre	ō′ker
o	as in pot	knock	nok
oi	as in boil	coign	koin
oo	as in foot, or in boot	pull, rule	pool, rool
ow	as in cow	tousled	towz′ld
ū	as in tube	beauty	bū′ti
u	as in but	dozen	duzn
ȳ	as in fly	hȳ′dra	—
y	as in merry	will′y-nill′y	—
ch	as in much	treachery	trech′er-i
g	as in get	guitar	gi-tar′
j	as in jump	gentle	jen′tl

In the case of words containing the following easy sounds pronunciation has often been omitted as being unnecessary :

ai	as in wait
ay	as in may
au	as in haul
ce-	as in certain
-ce	as in dance
ci-	as in cinder
ea	as in sea
ee	as in meet
-ey	as in donkey
-ful	as in cheerful
-ge	as in cage
-le	as in table, uncle, paddle, etc.
oa	as in road
ou	as in out
-ous	as in jealous
oy	as in boy
qu-	as in queen
-sion	as in mission
-tion	as in station

The syllable bearing the main stress is marked ′, e.g. **but′ter**.

ABBREVIATIONS USED

adj., adjs.	=adjective(s)
adv., advs.	=adverb(s)
conj., conjs.	=conjunction(s)
esp.	=especially
e.g.	=for example
etc.	=and other things, and so on
fem.	=feminine
i.e.	=that means
masc.	=masculine
n., ns.	=noun(s)
oppos.	=opposite
prep., preps.	=preposition(s)
pron., prons.	=pronoun(s)
v., vs.	=verb(s)

aback′, *adv.* backwards.—taken **aback**, taken by surprise.
ab′acus, *n.* a counting-frame.
abaft′, *adv.* and *prep.* on the aft or back part of a ship: behind.
aban′don, *v.* to give up: to forsake. —*adj.* **aban′doned**, forsaken: very wicked.
abase′, *v.* to cast down: to humble. —*n.* **abase′ment**.
abash′, *v.* to make ashamed.
abate′, *v.* to lessen: to grow less. —*n.* **abate′ment**, lessening: an amount taken off (e.g. The landlord made an *abatement* of £10 in the rent).
abattoir, a-bat-war′, *n.* a public slaughter-house.
abbé, ab′ā, *n.* a French name for a priest or clergyman.
abb′ess, *n.* the female head of an abbey or a convent.
abbey, ab′e, *n.* a monastery or convent ruled by an abbot or an abbess: the home of monks or nuns:—*pl.* **abb′eys**.
abb′ot, *n.* the head of an abbey:—*fem.* **abb′ess**.
abbreviate, ab-brē′vi-āt, *v.* to shorten.—*n.* **abbreviā′tion**.
ab′dicate, *v.* to give up an office (e.g. The king was forced to *abdicate*).—*n.* **abdicā′tion**.
abdōmen, *n.* the belly: the part of the body below the chest.—*adj.* **abdom′inal**.
abduct′, *v.* to take away by force or fraud.—*n.* **abduc′tion**.
abed′, *adv.* in bed.
abet′, *v.* to help or to encourage (generally to do wrong).—*n.* **abet′tor**.
abeyance, a-bā′ans, *n.* used in phrase *in abeyance*, e.g. The matter was left *in abeyance*=left undecided; The office of king was *in abeyance* =left unfilled for the time being.
abhor′, *v.* to shrink from with horror: to loathe.—*n.* **abhor′rence**, very great hatred.—*adj.* **abhor′rent**, hateful.
abide′, *v.* to wait for: to endure: to stay: to dwell.—*adj.* **abīd′ing**, lasting.
ability, a-bil′i-ti, *n.* power to do a thing: skill: cleverness.—*n.pl.* **abil′ities**, the powers of the mind.
ab′ject, *adj.* worthless: miserable (e.g. He is an *abject* coward).
abjure, ab-joor′, *v.* to swear to give up: to swear to leave for ever.
able, ā′bl, *adj.* having power to do a thing: skilful.—*adv.* **ā′bly**.
ablution, ab-loo′shun, *n.* washing of the body.
ab′negate, *v.* to deny.—*n.* **abnegā′tion**, denial.
abnor′mal, *adj.* unusual: irregular. —*n.* **abnormal′ity**, something unusual.
aboard′, *adv.* and *prep.* on board (a ship, train, aeroplane, etc.).
abode′, *n.* a dwelling-place.
abol′ish, *v.* to put an end to: to do away with.—*ns.* **aboli′tion**, the doing away with; **aboli′tionist**, one who seeks to do away with anything, esp. slavery.
abom′inate, *v.* to hate very much: to loathe.—*adj.* **abom′inable**, hateful: disgusting.—*n.* **abominā′tion**, great hatred: anything disgusting.
aborigines, ab-o-rij′in-ēz, *n.pl.* the original or native inhabitants of a country.—*adj.* **aborig′inal**.
abortive, ab-ort′iv, *adj.* coming to nothing, useless (e.g. He made an *abortive* attempt).
abound′, *v.* to be very plentiful: to have great quantity (of).
above, a-buv′, *prep.* and *adv.*, over: higher (than).—*adj.* **above-board**, frank: honourable.
abrade′, *v.* to scrape or rub off: to wear away by rubbing.—*ns.* **abrā′sion**, the act of rubbing off: a grazed or skinned place (e.g. of one's body); **abrā′sive**, something used for rubbing or polishing (e.g. emery-paper).

abreast, a-brest′, *adv.* with fronts in a line: side by side.—**abreast of the times**, up to date in one's knowledge, dress.

abridge, a-brij′, *v.* to shorten.—*n.* **abridg′ment** or **abridge′ment.**

abroad, a-brawd′, *adv.* out of doors: in another country.

ab′rogate, *v.* to set aside, to do away with (e.g. a law).—*n.* **abrogā′tion.**

abrupt′, *adj.* broken off quickly: sudden: steep: rude in manner.

abscess, ab′ses, *n.* a collection of diseased matter in some part of the body: a boil.

abscond′, *v.* to run away secretly.

abs′ent, *adj.* being away: not present: paying no attention.—*v.* (abs-ent′) to keep one's self away.—*ns.* **abs′ence**, the state of being away: inattention; **absentee′**, one who is absent.—*adj.* **abs′ent-mīnd′ed**, forgetful.

ab′solūte, *adj.* unbounded: complete: not limited by rules or laws (e.g. an *absolute* monarch).—*n.* **absolū′tion**, setting free from punishment: forgiveness.

absolve, ab-zolv′, *v.* to set free: to pardon.

absorb′, *v.* to suck in: to take up the whole attention.—*adjs.* **absorbed** (ab-sorbd′), entirely taken up with; **absorb′ent**, drinking in.—*n.* that which drinks in.—*n.* **absorp′tion**, the act of absorbing: entire occupation of mind.

abstain′, *v.* to hold one's self back from.—*ns.* **abstain′er**, one who holds back from something, esp. from strong drink; **absten′tion**, a holding back.

abstemious, abs-tēm′i-us, *adj.* sparing in food, drink, or enjoyments.

abs′tinent, *adj.* holding back from (e.g. from strong drink, pleasure).—*n.* **abs′tinence.**

abstract′, *v.* to draw or take away.—*adj.* **abstract′ed**, taken away: absent in mind.—*n.* **abstrac′tion**, absence of mind.

abs′tract, *adj.* existing only in the mind: difficult to understand.—*n.* a summary.

abstruse, abs-troos′, *adj.* hidden: difficult to understand.

absurd′, *adj.* clearly wrong: ridiculous.—*n.* **absurd′ity.**

abund′ance, *n.* great plenty.—*adj.* **abund′ant**, plentiful.

abuse, ab-ūz′, *v.* to use wrongly: to ill-use: to scold violently.—*n.* **abuse** (ab-ūs′), ill use: rude language.—*adj.* **abūs′ive.**

abut′, *v.* to border (on).

abyss, a-bis′, *n.* a bottomless depth.—*adj.* **abys′mal**, bottomless.

acacia, a-kā′shi-a, *n.* a family of thorny plants.

acad′emy, *n.* a higher school: a society for encouraging science or art.—*adjs.* **academ′ic**, learned: not practical; **academ′ical**, belonging to an academy or college.

accede, ak-sēd′, *v.* to agree (to).

accelerate, ak-sel′er-āt, *v.* to increase speed.—*ns.* **accelerā′tion**; **accel′erātor**, that which increases speed: a lever (e.g. in a motor-car) by which the speed is increased.

accent, ak′sent, *n.* stress on a syllable or word: a mark used to show this stress: a tone of voice (e.g. He speaks with a Scottish *accent*).—*v.* **accent′**, to lay stress on a syllable or word.—*v.* **accent′uāte**, to lay stress on.

accept, ak-sept′, *v.* to take something offered: to agree to.—*adj.* **accept′able** (ak-sept′a-bl or ak′sept-a-bl), satisfactory: pleasing.—*ns.* **accept′ance**, the act of accepting; **acceptā′tion**, the meaning of a word as generally understood.

access, ak′ses, *n.* right or means of approach: increase.—*n.* **accessibil′ity.**—*adj.* **access′ible**, easily approached.—*ns.* **access′ion**, a coming to (e.g. the *accession* of a king to his throne): an increase; **access′ary**, a helper (esp. in wrong-doing); **access′ory**, a tool (e.g. for a motor-car).

accident, ak′sid-ent, *n.* that which happens: an unexpected event: a mishap.—*adj.* **accident′al**, happening by chance.

acclaim′, *v.* to welcome with a glad shout.—*n.* **acclamā′tion**, a shout of applause.

acclī′matise, *v.* to accustom to another climate.—*n.* **acclimatisā′tion.**

accliv′ity, *n.* a slope upwards.

accom′modate, *v.* to find room for: to make suitable: to supply

(with). — *adj.* **accom'modāting,** finding room for: obliging.—*n.* **accommodā'tion,** space: lodgings.

accompany, ak-kum'pan-i, *v.* to go with: to play an instrument (e.g. piano) while someone sings or plays.—*ns.* **accom'paniment,** that which goes along with: the music played to help a singer; **accom'panist,** one who plays while another sings.

accomplice, ak-kom'plis, *n.* one who takes part, esp. in wrong-doing.

accom'plish, *v.* to complete: to bring about.—*adj.* **accom'plished,** well trained or educated.—*n.* **accom'plishment,** completion: something one is good at (e.g. Dancing was an *accomplishment* of hers).

accord', *v.* to agree: to give.—*n.* agreement.—*n.* **accord'ance,** agreement.—*adv.* **accord'ingly,** therefore.—**according to,** as told by (e.g. The Gospel *according to* St John).—**of one's own accord,** of one's own free will; **with one accord,** with one will, nobody being against.

accor'dion, *n.* a small musical wind-instrument with keys.

accost', *v.* to go up to and speak to.

account', *v.* to reckon: to value: (with *for*) to give a reason.—*n.* a bill: a reckoning up of money: a story.—*adj.* **account'able,** answerable: responsible.—*n.* **account'ant,** one whose duty it is to look after accounts.—**on account of,** because of.

accoutre, ak-koo'ter, *v.* to dress or fit out (esp. a warrior).—*n.pl.* **accou'trements,** a soldier's dress and arms.

accred'ited, *adj.* having power to act: trusted.

accrue, ak-kroo', *v.* to come by growth.—*adj.* **accrued'.**

accumulate, ak-kūm'ūl-āt, *v.* to heap up: to gather: to increase.—*ns.* **accumulā'tion,** a heaping up: a mass or pile; **accum'ulator,** a box, fitted with plates, for storing electricity.

accurate, ak'kūr-āt, *adj.* correct: exact.—*n.* **ac'curacy.**

accursed, ak-kurs'ed, *adj.* lying under a curse: doomed.

accuse, ak-kūz', *v.* to bring a charge against: to blame.—*ns.* **accusā'tion,** a charge brought against any one; **accused',** one charged with wrong-doing; **accus'er.**

accustom, ak-kus'tum, *v.* to make well-known by use.—*adj.* **accus'tomed,** usual: (with *to*) used to (e.g. I am *accustomed to* the heat).

ace, ās, *n.* the one at dice, cards, dominoes, etc.: a first-class airman.

acerbity, as-er'bi-ti, *n.* bitterness: harshness.

acetylene, a-set'i-lēn, *n.* a kind of *gas used for giving light and heat.*

ache, āk, *n.* a continued pain.—*v.* to be in continued pain.

achieve, a-chēv', *v.* to do: to accomplish: to win.—*n.* **achieve'ment,** something done: a great deed.

acid, as'id, *adj.* sour: sharp.—*n.* a sour substance.—*v.* **acid'ify,** to make sour.—*n.* **acid'ity,** sourness.

acknowledge, ak-nol'ej, *v.* to confess: to say one has received something.—*n.* **acknow'ledgment** or **acknow'ledgement.**

acme, ak'mē, *n.* the highest point: perfection.

ā'corn, *n.* the seed of the oak.

acoustic, a-koost'ik or a-kowst'ik, *adj.* having to do with hearing or sound.—*n.* **acoust'ics,** the science which deals with sound.

acquaint, ak-kwānt', *v.* to let one know: to inform.—*n.* **acquaint'ance,** knowledge: a person whom one knows.

acquiesce, ak-kwi-es', *v.* to agree to.—*n.* **acquies'cence.**

acquire, ak-kwīr', *v.* to gain: to get.—*ns.* **acquire'ment,** something learned or got; **acquisition** (ak-kwi-zish'un), the act of getting: something got.—*adj.* **acquis'itive,** eager to get.

acquit, ak-kwit', *v.* to free from blame: to behave or conduct (one's self).—*n.* **acquit'tal,** a setting free.

acre, ā'ker, *n.* a land measure containing 4840 square yards.—*n.* **a'creage,** the number of acres in a piece of land.

acrid, ak'rid, *adj.* harsh: bitter.

acrimony, ak'ri-mun-i, *n.* bitterness of feeling or speech.—*adj.* **acrimō'nious,** sharp, bitter.

ac′robat, *n.* one who does body-twisting and balancing tricks (e.g. a rope-dancer).—*adj.* **acrobat′ic.**
acrop′olis, *n.* a fortress in an old-time Greek city.
acrost′ic, *n.* a poem in which the first or last letters of each line, taken in order, spell a word or words.
act, *v.* to do: to conduct one's self: to pretend: to play a part (e.g. in a play).—*n.* something done: a law: a part of a play.—*ns.* **act′or,** *fem.* **act′ress,** one who acts or plays a part, esp. in a play; **action,** a deed: a battle: a law-case.—*adj.* **ac′tionable,** likely to cause a law-case (e.g. an *actionable* statement).—*adj.* **act′ive,** busy: nimble: lively.—*n.* **activ′ity.**
actual, akt′ū-al, *adj.* real.—*n.* **actual′ity.**—*adv.* **act′ually.**
actuary, akt′ū-ar-i, *n.* one who makes the calculations in an insurance office.—*adj.* **actuā′rial.**
actuate, akt′ū-āt, *v.* to put into action: to drive or urge on.
acū′men, *n.* sharpness: quickness of understanding.
acūte′, *adj.* sharp-pointed: quick at understanding: (of a disease) severe but not lasting very long.—*n.* **acute′ness.**
ad′age, *n.* an old saying: a proverb.
ad′amant, *n.* a very hard stone: the diamond.—*adj.* hard, like adamant: unwilling to give way.
adapt′, *v.* to make suitable: to alter so as to fit.—*adj.* **adapt′able,** easily put to a different use.
add, *v.* to put one thing to another: to sum up.—*n.* **addi′tion,** the act of adding: the thing added.—*adj.* **addi′tional.**
adden′dum, *n.* something added:—*pl.* **adden′da.**
ad′der, *n.* the common name of the viper: a poisonous serpent.
addict′, *v.* to give (one's self) up to (generally to an evil habit).—*n.* **ad′dict,** one who is given up to some evil habit.
ad′dle, *v.* to make rotten: to muddle.—*adj.* **ad′dled.**
address′, *v.* to speak or write to: to direct a letter.—*n.* the name of the house, street, and town where a person stays: the name, etc. on the envelope of a letter: a speech: manners: cleverness.
addūce′, *v.* to bring forward: to quote as an example.
ad′enoids, *n.* growths at the back of the nose which hinder breathing.
adept, ad-ept′ or ad′ept, *adj.* very skilful.—*n.* one very skilful at a thing.
adequate, ad′e-kwāt, *adj.* sufficient.—*n.* **ad′equacy.**
adhere, ad-hēr′, *v.* to stick to.—*n.* **adher′ence.**—*adj.* **adher′ent,** sticking to.—*n.* a follower, one who sticks to a cause.
adhesion, ad-hē′zhun, *n.* the act of sticking to.—*adj.* **adhēs′ive,** sticky, gummed.—*n.* a gummy substance.
adieu, a-dū′, good-bye: farewell.—*n.* a farewell:—*pl.* **adieus** or **adieux** (a-dūz′).
adipose, ad′i-pōz, *adj.* fatty.
ad′it, *n.* an opening or passage, esp. into a mine.
adjacent, ad-jās′ent, *adj.* lying near to.
adjective, ad′jek-tiv, *n.* a word which tells something about a noun (e.g. the *black* dog; a *high* hill; the work is *hard*).—*adj.* **adjectīv′al.**
adjoin′, *v.* to lie next to.—*adj.* **adjoin′ing.**
adjourn, ad-jurn′, *v.* to put off to another day: to leave off.—*n.* **adjourn′ment.**
adjudge, ad-juj′, *v.* to decide: to settle.
adjudicate, ad-joo′di-kāt, *v.* to settle, as a judge does: to give a decision.—*ns.* **adjudicā′tion,** a decision or judgment; **adju′dicātor,** one who gives a decision.
ad′junct, *n.* something joined or added.
adjure, ad-joor′, *v.* to charge on oath.
adjust′, *v.* to prepare: to settle.—*adj.* **adjust′able.**—*n.* **adjust′ment.**
adjutant, ad′joot-ant, *n.* an officer who assists a commanding officer: a large stork-like bird found in India.
admin′ister, *v.* to manage: to carry out: to give (e.g. help, medicine, etc.) to.—*n.* **administrā′tion,** management: the body that

carries on the government of a country.—*adj.* admin'istrative.—*n.* administrā'tor, one who manages: a governor.

ad'miral, *n.* the commander of a navy.—*n.* ad'miralty, the government office which manages naval affairs.

admire', *v.* to think very highly of.—*adj.* ad'mirable, worthy of being admired.—*adv.* ad'mirably.—*ns.* admirā'tion; admīr'er.

admit', *v.* to let in: to own the truth of: (with *of*) to make possible.—*ns.* admis'sion, a letting in: money paid to allow one to enter a meeting, concert, etc.: a confession; admit'tance, the right or leave to enter.—*adj.* admiss'ible, allowable.—*adv.* admit'tedly, without a doubt.

admix', *v.* to mix.—*n.* admix'ture.

admon'ish, *v.* to warn: to reprove.—*n.* admoni'tion, a warning.—*adj.* admon'itory.

ado, a-doo', *n.* trouble: fuss.

adolescent, ad-o-les'ent, *adj.* growing to manhood or womanhood.—*n.* a growing person of either sex.—*n.* adoles'cence, the period of youth.

adopt', *v.* to choose: to take as one's own.—*n.* adop'tion.

adore, ad-ōr', *v.* to worship: to love very much.—*adj.* ador'able, worthy of being loved.—*adv.* ador'ably.—*ns.* adorā'tion, worship: great regard.

adorn', *v.* to make beautiful.—*n.* adorn'ment, ornament.

adrift', *adv.* floating hither and thither.

adroit, a-droit', *adj.* clever: skilful.

adulation, ad-ū-lā'shun, *n.* praise: flattery.—*adj.* ad'ulatory.

adult, ad-ult', *adj.* grown up.—*n.* (ad'ult) a grown-up person.

adulterate, ad-ult'er-āt, *v.* to make impure (e.g. by mixing water with milk).—*n.* adulterā'tion.

adult'ery, *n.* a breaking of the marriage promise: unfaithfulness to one's wife or husband.—*n.* adult'erer (*fem.* adult'eress).

advance, ad-vans', *v.* to put forward: to go forward: to rise: to lend (money).—*adj.* advanced', far on (e.g. in age, school career, etc.).—*ns.* advance', a going forward: progress: improvement: a loan (of money); advance-guard, a part of an army sent on in front; advance'ment, progress.—in advance, beforehand.

advantage, ad-vant'āj, *n.* a gain or benefit.—*v.* to help.—*adj.* advantā'geous, profitable: helpful.

ad'vent, *n.* a coming.—Advent, the period of about a month before Christmas.

adventitious, ad-vent-ish'us, *adj.* happening by chance.

adventure, ad-vent'ūr, *n.* a risk: a bold or risky undertaking.—*v.* to dare: to risk.—*n.* advent'urer, one who does bold deeds or takes risks.

ad'verb, *n.* a word which gives a more definite meaning to a verb, adjective, or other adverb (e.g. he writes *neatly*; the sky is *beautifully* clear; he works *very* slowly).—*adj.* adverb'ial, belonging to an adverb.

adversary, ad'vers-ar-i, *n.* an enemy.

adverse, ad'vers, *adj.* acting against: harmful.—*n.* advers'ity, misfortune.

advert', *v.* to turn one's attention to.

advertise, ad-vert-īz', *v.* to make known to the public.—*ns.* advert'isement, a public announcement; advertīs'er.

advice, ad-vīs', *n.* something said as a help: counsel.—*v.* advise (ad-vīz'), to give advice to: to recommend.—*adj.* advis'able, wise: suitable.—*ns.* advisabil'ity; advis'er.—*adj.* advis'ory, advice-giving.—*adv.* advis'edly, purposely.

advocate, ad'vo-kāt, *n.* a defender: one who pleads for another: in Scotland, a court lawyer.—*v.* to plead for: to recommend.

adze, adz, adz, *n.* a kind of axe used by a carpenter.

æon, eon, ē'on, *n.* a very long period of time: an age.

aerate, ā'er-āt, *v.* to put air (or some other gas) into.

aerial, ā-ēr'i-al or ār'i-al, *adj.* belonging to the air: placed high up or overhead (e.g. an *aerial* railway): having to do with aeroplanes and airships.

aerial, ār'i-al, *n.* a wire or rod (or a set of these) by means of which wireless or television signals are received or sent.
aerie or **aery**, ā'ri or ē'ri or ī'ri, *n.* an older spelling of eyry.
aerobatics, ār'o-bat'iks, *n.* stunting by an aircraft in the air.
aerodrome, ār'o-drōm, *n.* an aeroplane or airship station.
aeronaut, ār'o-nawt, *n.* an airman.
aeroplane, ār'ō-plān, *n.* a flying-machine heavier than air.
aesthetic, ēs-thet'ik, *adj.* having to do with beauty.
affable, af'fa-bl, *adj.* pleasant: easy to speak to.—*n.* **affabil'ity.**
affair, af-fār', *n.* something to be done: business: a matter.
affect, af-fekt', *v.* to act upon: to move the feelings: to pretend.—*adjs.* **affect'ed,** moved in the feelings: not natural, sham; **affect'ing,** moving the feelings.—*n.* **affectā'tion,** a striving after something not natural: pretence.
affection, af-fek'shun, *n.* kindness or love.—*adj.* **affec'tionate,** loving.—*adv.* **affec'tionately.**
affianced, af-fī'anced, *adj.* engaged to be married.
affidavit, af-fi-dā'vit, *n.* a written statement made on oath.
affinity, af-fin'i-ti, *n.* nearness of kin: likeness: close agreement.
affirm', *v.* to state firmly.—*n.* **affirmā'tion,** a firm statement: a statement made but not on oath.—*adj.* **affirm'ative,** saying 'yes.'—*n.* a statement which means yes.—**to answer in the affirmative,** to reply 'yes.'
affix', *v.* to fix to: to add.—*n.* **af'fix,** an addition to a word either before or after it.
afflict, af-flikt', *v.* to give continued pain.—*adj.* **afflict'ed,** suffering.—*n.* **afflic'tion,** great suffering: misery: grief.
affluent, af'floo-ent, *adj.* wealthy.—*n.* a stream flowing towards a river or lake.—*n.* **af'fluence,** abundance: wealth.
afford', *v.* to yield: to be able to pay for.
affor'est, *v.* to turn land into forest.—*n.* **afforestā'tion.**
affray, af-frā', *n.* a fight causing alarm: a brawl.
affright, af-frīt', *v.* to frighten.—*n.* great fear.—*adj.* **affright'ed.**
affront, af-frunt', *v.* to insult.—*n.* an insult.
afire, a-fīr', *adv.* on fire.
aflame, a-flām', *adj.* and *adv.* flaming: blazing.
afloat, a-flōt', *adv.* and *adj.* floating.
afoot', *adv.* on foot: happening, or about to happen.
aforesaid, a-fōr'sed, *adj.* said or named before.
aforetime, a-fōr'tīm, *adv.* in past times.
afraid, a-frād', *adj.* struck with fear.
afresh', *adv.* again, anew.
Afrikan'der, Afrikan'er, *n.* a white person born in South Africa.
aft, *adj.* or *adv.* behind: at the back.
aft'er, *prep.* and *adv.* behind: later: done in the same way as (e.g. The picture was *after* Landseer).
aft'ermath, *n.* a second mowing of grass in the same season: the bad effects of something, esp. of a war (e.g. Poverty is the *aftermath* of war).
aft'ernoon', *n.* the time between noon and evening.
afterthought, aft'er-thawt, *n.* a later thought.
aft'erward, aft'erwards, *adv.* later.
against', *prep.* opposite to.
agape, a-gāp', *adj.* or *adv.* gaping: with open mouth.
agate, ag'āt, *n.* a kind of precious stone.
age, āj, *n.* a long period of time: the time a person or thing has lived or existed.—*v.* to grow old: to make old.—*adj.* **aged** (āj'ed), old: (ājd) of the age of.—*n.pl.* (āj'ed) old people.—*adjs.* **age'less,** never growing old; **age'long,** lasting for a great length of time.
agenda, aj-end'a, *n.* things to be done: a note of matters to be brought before a meeting.
agent, āj'ent, *n.* a person or thing that acts: one who acts for another.—*n.* **ag'ency,** the office or business of an agent: action or power (e.g. Many seeds are scattered by the *agency* of wind).

agglomerate, ag-glom′er-āt, *v.* to gather together.—*n.* **agglomerā′tion**, a heap.

aggrandise, ag′grand-īz, *v.* to make greater.—*n.* **aggrandisement** (ag-grand′iz-ment).

aggravate, ag′grav-āt, *v.* to make worse: to annoy.—*adj.* **ag′gravating**.—*n.* **aggravā′tion**.

aggregate, ag′greg-āt, *v.* to add together.—*n.* a total.—*n.* **aggregā′tion**, a collection.

aggress′, *v.* to attack first.—*adj.* **aggress′ive**, ready to attack first: quarrelsome.—*ns.* **aggress′iveness**; **aggress′ion**; **aggress′or**.

aggrieve, ag-grēv′, *v.* to pain or injure.

aghast, a-gast′, *adj.* struck with horror.

agile, aj′il, *adj.* active: nimble.—*n.* **agil′ity**.

agitate, aj′i-tāt, *v.* to stir up: to disturb.—*ns.* **agitā′tion**; **ag′itator**.

aglow, a-glō′, *adj.* and *adv.* very warm: red-hot.

agog′, *adj.* and *adv.* eager: astir.

agony, ag′on-i, *n.* great pain.—*v.* **ag′onise**, to cause great pain.—*adj.* **ag′onising**.

agrarian, ag-rā′ri-an, *adj.* having to do with land and farming.

agree, a-grē′, *v.* to be alike (in thinking, in appearance, etc.): to consent.—*adj.* **agree′able**, suitable: pleasant: ready to agree.—*adv.* **agree′ably**.—*n.* **agree′ment**, likeness (e.g. of opinions, appearance): a written statement making a bargain.

agriculture, ag′ri-kult-ūr, *n.* the tilling of the land: farming.—*adj.* **agricult′ural**.—*n.* **agricult′urist**, a farmer.

ague, ā′gū, *n.* a fever.

ahead, a-hed′, *adv.* in front.

aid, *v.* to help, assist.—*n.* help.

aide-de-camp, ād′-de-kong, *n.* an officer who carries messages to and from a general on the field:—*pl.* **aides′-de-camp**.

ail, *v.* to be ill: to trouble.—*n.* **ail′ment**, a trouble, disease.

aim, *v.* to point at (e.g. with a gun): to try to do.—*n.* the act of pointing at: plan or intention.—*adj.* **aim′less**, without aim.

air, ār, *n.* the mixture of gases which we breathe: a light breeze: a tune or the leading part of a tune: the look or manner (of a person).—*v.* to expose to the air: to dry: to make known.—*n.* **air′ing**, the act of exposing to the air: a short walk or drive in the open air.—*adjs.* **air′y**; **air′less**.—*adv.* **air′ily**, in a lively fashion.—*ns.* **air′craft**, flying-machines; **air′-gun**, a gun from which the bullet is driven by the force of air; **air′-liner**, an aeroplane for carrying passengers and mails; **air′man**, one who pilots an aircraft; **air′-pump**, a pump for sucking out air; **air′-raid**, an attack by aeroplanes; **air-raid precautions**, see **A.R.P.**; **air-raid warden**, one who, during an air-raid, is expected to see to the safety of the public; **air-raid warning**, a signal or sound which gives warning of a coming air-raid; **air′ship**, a great balloon which can be steered and driven.—*adjs.* **air-borne**, in, or carried by, the air; **air′-tight**, made so that air cannot pass in or out.

aisle, īl, *n.* the side part of a church: a passage between the seats.

ajar′, *adv.* partly open.

akim′bo, *adv.* with hand on hip and elbow bent outward.

akin′, *adj.* related by blood: similar.

alabas′ter, *n.* a marble-like substance.

alack′! a cry showing sorrow.

alacrity, a-lak′ri-ti, *n.* briskness: cheerful readiness.

alarm′, *n.* sudden fear: something which rouses to action or gives warning of danger (e.g. an *alarm-clock*, a *fire-alarm*).—*v.* to frighten.—*adj.* **alarm′ing**.—*adv.* **alarm′ingly**.—*n.* **alarm′ist**, one who frightens others needlessly.

alas′! a cry showing grief.

al′batross, *n.* a large sea-bird.

albē′it, although it be: even if.

al′bert, *n.* a short watch-chain.

albino, al-bē′no, *n.* a person or animal with white skin and hair and pink eye-pupils:—*pl.* **albi′nos**.

al′bum, *n.* a book with blank pages for holding photograp[hs,] stamps, signatures, etc.

albumen, al-bū′men, *n.* the white of eggs: a substance like it found in animals and vegetables.

alchemy, al′ke-mi, *n.* the changing of other metals into gold: a complete change.—*n.* **al′chemist**, one who tries to change metals to gold.

alcohol, al′kō-hol, *n.* pure spirit which forms the strong part of strong drinks.—*adj.* **alcohol′ic.**

al′cove, *n.* a small room off a larger room: a summer-house in a garden.

alder, awl′der, *n.* a tree often found growing beside ponds and rivers.

alderman, awl′der-man, *n.* a member of a town council next in rank to the mayor.

ale, *n.* a drink made from malt.—*n.* **ale′-house**, a house in which ale is sold.

alert′, *n.* a warning signal of air-raid danger.—*adj.* watchful: brisk.—**on the alert**, on the watch.

al′fa or **hal′fa**, *n.* esparto grass.

alfal′fa, *n.* a kind of grass.

alfresco, al-fresk′o, *adj.* and *adv.* in the open air.

algebra, al′je-bra, *n.* a method of counting, using letters and signs.

alias, ā′li-as, *adv.* otherwise.—*n.* a false name:—*pl.* **a′liases.**

alibi, al′i-bī, *n.* the plea that a person charged with a crime was elsewhere when the deed was done.

alien, āl′yen, *adj.* foreign: different in kind.—*n.* a foreigner.—*v.* **ā′lienāte**, to take away: to make strange or unfriendly.

alight, a-līt′, *v.* to come down: to settle upon.

alight, a-līt′, *adj.* on fire.

align, a-līn′, *v.* to set in line.—*n.* **align′ment**, arrangement in a line.

al′iment, *n.* food.—*adj.* **aliment′ary**, having to do with food.

alkali, al′ka-li, or -lī, *n.* a substance such as soda or potash, the opposite of an acid.—*adj.* **al′kaline.**

all, *adj.* and *pron.* every one: the whole.—*n.* **all-clear**, the signal that an air-raid is over.—**all right**, quite good or suitable.

Allah, al′la, *n.* the Arab name for God.

allay′, *v.* to calm.

allege, al-lej′, *v.* to give as one's opinion.—*n.* **allegā′tion.**

allegiance, al-lēj′i-ans, *n.* obedience: the duty of a subject to his king: loyalty.

allegory, al′le-gor-i, *n.* a story or fable describing one thing under the image of another: a parable.—*adj.* **allegor′ical.**

alleviate, al-lēv′i-āt, *v.* to make light: to lessen.—*n.* **alleviā′tion.**

alley, al′li, *n.* garden walk: a narrow passage:—*pl.* **all′eys.**

All-fools′-day, *n.* April first.

alliance, al-lī′ans, *n.* union, esp. by marriage or treaty.

al′ligātor, *n.* a kind of crocodile.

alliteration, al-lit-er-ā′shun, *n.* the repetition of the same sound at the beginning of two or more words close together, e.g. 'Sing a Song of Sixpence.'

allocate, al′lo-kāt, *v.* to place: to give to each his share.—*n.* **allocā′tion.**

allot′, *v.* to give to each his share: to distribute: to parcel out.—*n.* **allot′ment**, the act of giving out: a small plot of ground for growing vegetables, etc.

allow′, *v.* to grant: to permit.—*adj.* **allow′able.**—*n.* **allow′ance**, a fixed sum or amount: an excuse (e.g. The judge made *allowance* for the age of the prisoner, and set him free).

al′loy, *n.* a mixture of two or more metals.

allude, al-lood′, *v.* to mention in passing: to refer to.—*n.* **allu′sion.**—*adj.* **allus′ive.**

allure, al-lūr′, *v.* to entice.—*n.* **allure′ment.**—*adj.* **allur′ing.**

alluvium, al-lū′vi-um, *n.* earth brought down and left by rivers in flood.—*adj.* **allū′vial.**

ally, al-lī′, *v.* to join one's self to (by treaty, etc.).—*adj.* **allied′.**—*n.* **ally** (al′lī), a helper: friend.

almanac, a(w)l′ma-nak, *n.* a calendar: a yearly list of days, weeks, and months.

almighty, awl-mīt′i, *adj.* all-powerful.—**The Almighty**, God.

almond, ah′mund, *n.* the fruit or nut of the almond-tree.

almoner, al′mun-er, *n.* one who gives out gifts.—*n.* **al′monry**, a place where gifts are given out.

alms, ahmz, *n.* gifts to the poor.—*n.* **alms'house**, a house for the poor.

aloe, al'ō, *n.* a plant used in medicines.—*n.* **al'oes**, a bitter drug got from aloes.

aloft', *adv.* on high.

alone, al-ōn', *adj.* standing by itself.—*adv.* singly, by itself.

alongside, al-ong-sīd', *adv.* beside: side by side: close to a ship's side.

aloof', *adv.* at a distance.—*n.* **aloof'ness**, lack of interest: coldness of manner.

aloud', *adv.* so as to be heard.

alp, *n.* a high mountain: a cattle-meadow on a mountain.—*adj.* **alp'ine**, belonging to the Alps or other high mountains.

alpaca, al-pak'a, *n.* a kind of sheep, with long silky wool, found in Peru: cloth made of this wool.

alpenstock, alp'n-stok, *n.* a long staff used in climbing mountains.

alpha, al'fa, *n.* the first letter of the Greek alphabet: the beginning.

alphabet, al'fa-bet, *n.* the letters of a language given in order.—*adjs.* **alphabet'ic, -al**, in the order of the alphabet.

already, awl-red'i, *adv.* beforehand: even now.

alsatian, al-sā'shi-an, *n.* a large, wolf-like dog.

altar, awlt'er, *n.* a raised place where sacrifices are offered: in Christian churches, the communion table.

alter, awl'ter, *v.* to change.—*n.* **alterā'tion**.

altercate, awl'ter-kāt, *v.* to dispute or quarrel.—*n.* **altercā'tion**.

alternate, awl'ter-nāt, *v.* to cause to follow by turns: to happen by turns.—*adj.* **alter'nate**, happening or coming time about or in turns.—*adv.* **alter'nately**.—*n.* **alternā'tion**.—*adj.* **alter'native**, offering a choice of two things.—*n.* a choice between two things.

although, awl-tho', *conj.* though.

alt'itude, *n.* height above sea-level.

alt'o, *n.* the male voice of the highest pitch: the female voice of lowest pitch (really *contralto*).

altogether, awl-too-geth'er, *adv.* all gathered in one place: wholly.

altruism, al'troo-ism, *n.* something done for the good of others.—*adj.* **altruist'ic**.

al'um, *n.* a mineral salt having a sharp taste.

aluminium, a-lum-in'i-um, *n.* a very light metal, looking rather like silver.

always, awl'wāz, *adv.* for ever.

amain, a-mān', *adv.* with full force or speed.

amal'gam, *n.* a mixture of mercury with another metal.—*v.* **amal'gamāte**, to unite.—*n.* **amalgamā'tion**.

amanuensis, a-man-ū-en'sis, *n.* one who writes to dictation: a secretary:—*pl.* **amanuen'sēs**.

amass', *v.* to gather in large quantity.

amateur, am'at-ūr or am-at-er', *n.* one who takes part in a thing for the love of it, not for gain.—Also *adj.*—*adj.* **amateur'ish**, imperfect: not the best.

amatory, am'at-or-i, *adj.* having to do with love: affectionate.

amaze, a-māz', *v.* to astonish: to surprise greatly.—*adv.* **amāz'edly**.—*n.* **amāze'ment**.

am'azons, *n.pl.* in old tales, a nation of warrior women who fought under their queen.

ambass'ador, *n.* a minister of the highest rank sent to look after the affairs of one country in another country.

am'ber, *n.* a yellowish substance, like resin, used for ornaments, beads, etc.—*adj.* made of amber: amber-coloured.

ambergris, am'ber-grēs, *n.* a sweet-smelling substance of an ash-grey colour, found floating on warm seas (it comes from a kind of whale).

ambidextrous, am-bi-decks'trus, **ambidex'ter**, *adjs.* able to use both hands with equal skill.—*n.* **amb'idexter'ity**.

ambiguous, am-big'ū-us, *adj.* having two meanings: not clear.—*n.* **ambigū'ity**.

ambition, am-bish'n, *n.* the desire to rise: a wish for power or fame.—*adj.* **ambi'tious**, hoping to do great things.

amble, am′bl, *v.* to move like a horse (i.e. by lifting together both legs on one side and then those on the other): to move at an easy pace. —*n.* a pace of a horse—between a trot and a walk.

ambrosia, am-brō′z(h)i-a, *n.* in old stories, the food of the gods, which gave eternal youth and beauty to those who ate it: something very sweet and pleasing.

ambulance, am′būl-ans, *n.* a van (usually motor) for carrying the sick or injured.—Also *adj.* (e.g. *ambulance* train, ship).

ambush, am′boosh, **am′buscade**, *ns.* a hidden body of troops, waiting to attack by surprise.—*v.* to lie in wait for an enemy and attack him by surprise.

ameliorate, a-mēl′yor-āt, *v.* to make better: to improve: to grow better.—*n.* **ameliorā′tion.**

āmen, or ah-men, so let it be!

amē′nable, *adj.* easily led: ready to take advice.

amend′, *v.* to correct: to improve. —*n.* **amend′ment**, a change (e.g. in a law).—**to make amends**, to make up for having done wrong.

amenity, am-en′i-ti, *n.* pleasantness of situation and surroundings.

amethyst, a′meth-ist, *n.* a precious stone of a bluish-violet colour.

amiable, ām′i-a-bl, *adj.* lovable: of a sweet nature.—*n.* **amiabil′ity.**

amicable, am′ik-a-bl, *adj.* friendly.

amid′, **amidst′**, *preps.* in the middle: among. — *adv.* **amid′ships**, half-way between the stem and stern of a ship.

amiss′, *adj.* wrong.—*adv.* in a faulty manner.—*adj.* **amiss′ing**, lost: wanting.

amity, am′i-ti, *n.* friendship: good-will.

ammō′nia, *n.* a strong-smelling gas given off by smelling-salts, burning feathers, etc.: a mixture of this gas in water.—*adj.* **ammōn′iated**, containing ammonia.

ammunition, am-mūn-ish′un, *n.* powder, bullets, shells, bombs.

amnesty, am′nest-i, *n.* a general pardon of wrong-doers.

amok′. See **amuck.**

among, **amongst**, a-mung(st)′, *prep.* in the midst of: along with.

amorous, am′or-us, *adj.* loving: ready to love.

amount, a-mownt′, *v.* to come or rise to (e.g. His savings *amounted* to ten pounds).—*n.* the whole sum.

ampère, am′pēr, *n.* the unit used in measuring an electric current.

amphibian, am-fib′i-an, *n.* an animal that can live both on land and in water:—*pl.* **amphib′ia**, **amphib′ians.**—*adj.* **amphib′ious.**

amphitheatre, am-fi-thē′a-ter, *n.* in the time of the Romans, a round building having rows of seats one above another, around an open space, called the arena, in which public shows were given.

am′ple, *adj.* plenty: large enough.

amplify, am′pli-fī, *v.* to increase: to make bigger.—*ns.* **amplificā′tion**; **am′plifier**, (in wireless) a part of the set for increasing sound.

amplitude, am′pli-tūd, *n.* largeness: size.

amputate, am′pūt-āt, *v.* to cut off (e.g. a limb).—*n.* **amputā′tion.**

amuck′ or **amok′**, *adv.* madly—hardly ever used save in the phrase 'to run *amuck*' (i.e. to run mad and do damage).

amulet, am′ū-let, *n.* something worn as a charm against evil.

amuse, a-mūz′, *v.* to give pleasure to: to entertain.—*n.* **amuse′ment.** —*adj.* **amus′ing**, giving pleasure: funny.

anachronism, an-a′kron-izm, *n.* the mistake of mentioning something which did not exist at the time spoken about (e.g. in Shakespeare's play *Julius Cæsar*, which refers to the year 44 B.C., the mention of a striking clock is an *anachronism*; mechanical clocks were not invented till the 10th century A.D.).

anaconda, an-a-kon′da, *n.* a large South American water-snake.

anæmia, an-ēm′i-a, *n.* poorness of blood in the body. — *adj.* **anæ′mic**, bloodless: pale or ill-looking.

anæsthetic, an-ēs-thet′ik, *n.* a substance (e.g. chloroform) that takes away feeling for a time. —*ns.* **anæsthē′sia**, **anæsthē′sis**;

anæsthet'ist, one who gives anæsthetics.

an'agram, *n.* a word or sentence formed by rewriting (in a different order) the letters of another word or sentence (e.g. 'live' = 'evil,' 'Florence Nightingale' = 'Flit on, cheering angel').

analogy, an-al'o-ji, *n.* a likeness.—*adj.* anal'ogous.

analysis, an-al'is-is, *n.* a breaking up of a thing into its parts:—*pl.* anal'yses.—*v.* an'alyse.—*n.* an'alyst, a person who analyses: a chemist.

anarchy, an'ark-i, *n.* a state of lawlessness in a country due to there being no government: disorder or confusion.—*n.* an'archist, one who wishes to do away with law and government.

anath'ema, *n.* a solemn curse by the Church: anything hateful or cursed.

anatomy, an-a'tom-i, *n.* the part of a doctor's training which has to do with the cutting up of the body and the study of its different parts: the body.—*n.* anat'omist.

ancestor, an'ses-tur, *n.* a forefather:—*fem.* an'cestress.—*adj.* ances'tral.—*n.* an'cestry, the list of one's forefathers.

anchor, ang'kor, *n.* a heavy piece of iron, with hooked ends, for holding a ship fast to the bed of the sea or river.—*v.* to fix by anchor: to throw out the anchor.—*n.* anch'orage, a place where a ship can anchor.—to cast anchor, to let down the anchor; to weigh anchor, to take up the anchor so as to be able to sail away.

anchorite, ang'kor-īt, anchoret, ang'kor-et, *n.* a hermit.

anchovy, an-chō'vi, *n.* a small fish of the herring family.

ancient, ān'shent, *adj.* old.—*n.pl.* an'cients, those who lived long ago.

andante, an-dan'te, *n.* a piece of music moving evenly and somewhat slowly.

anecdote, an'ek-dōt, *n.* a short story.

anemometer, a-ne-mom'et-er, *n.* an instrument for measuring the speed or pressure of the wind.

anemone, a-nem'o-ne, *n.* a plant of the crowfoot family.

anent', *prep.* concerning.

an'eroid, *n.* a barometer in which the pressure of the air is measured without the use of mercury.

anew, a-nū', *adv.* afresh: again.

angel, ān'jel, *n.* a messenger sent by God: a person bringing help or good news.—*adj.* angel'ic.

angelica, an-jel'i-ka, *n.* a plant, found in woods and meadows, with an umbrella-like flower.

angelus, an'je-lus, *n.* the 'Hail Mary,' or prayer to the Virgin: the bell rung in Roman Catholic countries at morning, noon, and sunset.

anger, ang'ger, *n.* a bitter feeling against one who we think has done wrong.—*v.* to make angry.—*adj.* an'gry.—*adv.* an'grily.

angle, ang'gl, *n.* a corner: the point where two lines meet: the space between these lines.—*adj.* ang'ūlar.—*n.* angūlar'ity.

angle, ang'gl, *v.* to fish with a rod, etc.: to entice.—*n.* angl'er.

Anglican, ang'glik-an, *adj.* belonging to the Church of England.

anglicise, ang'gli-sīz, *v.* to turn into English.

Anglo, ang'glo, *prefix* English.—*n.* and *adj.* Ang'lo-Sax'on, a name for the people of England and their language before the Norman Conquest. (The *Angles* and *Saxons* were two of the peoples who came from north-west Europe to settle in England in the 5th and 6th centuries.)

angora, ang-gō'ra, *n.* a goat with long silky hair.

angry. See anger.

anguish, ang'gwish, *n.* very great pain of body or mind: agony.

aniline, an'il-in, *n.* a product of coal-tar much used in dyeing.

animadvert, an-im-ad-vert', *v.* to draw attention to: to blame.—*n.* animadver'sion.

an'imal, *n.* a living being which can feel and move of its own accord.—*adj.* having to do with animals: high-spirited.

animalcule, an-im-al'kūl, *n.* a very tiny animal.

animate, an′im-āt, *v.* to give life to: to stir up.—*adj.* living.—*adj.* **an′imated**, lively.—*n.* **animā′tion**, liveliness.
animosity, an-im-os′i ti, *n.* bitter hatred: enmity.
an′imus, *n.* feeling against.
ankle, angk′l, *n.* the joint connecting the foot and leg.—*n.* **ank′let**, an ornament for the ankle.
an′na, *n.* an Indian coin worth about 1d.
annals, an′alz, *n.pl.* history told year by year: story (e.g. The *annals* of our club are interesting).—*n.* **ann′alist**, a writer of annals.
anneal, an-ēl′, *v.* to make glass or metals hard by exposing them to great heat and allowing them to cool gradually.
annex′, *v.* to add to the end: to take possession of.—*ns.* **annexe** (an′nex), a building added; **annexā′tion.**
annihilate, an-nī′hil-āt, *v.* to destroy so completely that nothing is left.—*n.* **annihilā′tion.**
anniver′sary, *n.* a birthday: the day of each year when some event is remembered (e.g. November 11 is the *anniversary* of the end of the First World War).
annotate, an′not-āt, *v.* to make notes upon.—*n.* **annotā′tion.**
announce an-nowns′, *v.* to make known.—*ns.* **announce′ment**; **announc′er**, in broadcasting, one who makes known the items of a wireless programme.
annoy′, *v.* to vex: to tease.—*n.* **annoy′ance**, that which annoys.
annual, an′nū-al, *adj.* yearly.—*n.* a plant that lives only one year: a book published yearly.—*adv.* **an′nually.**
annuity, an-nū′i-ti, *n.* a yearly payment made for a certain time or for life.—*n.* **annū′itant**, one who receives an annuity.
annul′, *v.* to do away with: to abolish.—*n.* **annul′ment.**
annular, an′nūl-ar, *adj.* ring-shaped.
annunciate, an-nun′si-āt, *v.* to announce.—*ns.* **annun′ciation**; **Annunciation Day**, a church festival, held on 25th of March (Lady Day).
anodyne, an′o-dīn, *n.* a medicine that soothes pain.
anoint′, *v.* to smear with ointment or oil: to make holy by pouring on oil.—*n.* **anoint′ing.**
anomaly, an-om′al-i, *n.* something not according to rule.—*adj.* **anom′alous.**
anon′, *adv.* at once: some time soon.
anonymous, an-on′im-us, *adj.* without a name.—*n.* **anonym′ity.**
answer, an′ser, *v.* to reply to, esp. to a question: to find the result (e.g. of a sum or problem): to be suitable: to be to blame for: to suffer for.—*n.* a reply: a solution.—*adj.* **an′swerable**, able to be answered: suitable for: to be blamed for.
ant, *n.* a small, hard-working insect.
antag′onist, *n.* an enemy: one's opponent in a game.—*n.* **antag′onism**, enmity.—*v.* **antag′onise**, to make an enemy of someone.—*adj.* **antagonis′tic**, opposed to.
Antarctic, ant-ark′tik, *adj.* opposite the Arctic: having to do with the South Pole.—**Antarctic Circle**, a circle drawn on the map round the South Polar regions.
antecedent, an-te-sēd′ent, *adj.* going before in time.—*n.* that which goes before in time: one who lived at an earlier time: an ancestor.
antechamber, an′te-chām-ber, *n.* a small room leading to a larger room.
an′tedate, *v.* to date before the true time.
antediluvian, an-te-di-lū′vi-an, *adj.* existing or happening before the Flood: very old-fashioned.
antelope, an′te-lōp *n.* a graceful, swift-running, deer-like animal.
antennæ, an-ten′ē, *n.pl.* the feelers of insects.
anterior, an-tē′ri-or, *adj.* before (in time or place): in front.
an′teroom, *n.* a room leading into a large room.
an′them, *n.* a piece of sacred music sung in parts: any song of praise.
an′ther, *n.* (in a flower) the top of the stamen holding the pollen.
anthology, an-thol′oj-i, *n.* a collection of specially chosen poems, stories, etc.

anthracite, an'thras-it, *n.* a kind of coal that burns nearly without flame, smell, or smoke.

an'thrax, *n.* a disease common among sheep and cattle, and sometimes attacking men.

anthropoid, an'throp-oid, *adj.* like a human being in shape or look.—**anthropoid apes**, monkeys which, in many ways, are like human beings (gorillas, chimpanzees).

an'ti, *prefix*, against.—**anti-aircraft gun**, a gun for firing at aeroplanes.

antics, *n.pl.* tricks: capers.

anticipate, an-tis'ip-āt, *v.* to foresee: to expect.—*n.* **anticipā'tion.**

anticli'max, *n.* the arranging of ideas so that they become less important towards the end.

anticyclone, an-ti-sī'klōn, *n.* a system of winds blowing round and out from an area of high pressure.

antidote, an'ti-dōt, *n.* that which is given to act against the effect of poison: a cure.

antimacassar, an-ti-mak-as'ar, *n.* a covering for sofas, cushions, etc.

antimony, an'ti-mun-i, *n.* a bluish-white metal.

antipathy, an-tip'ath-i, *n.* dislike.

antipodes, an-tip'od-ēz, *n.pl.* places on the earth's surface exactly opposite each other, such as Britain and New Zealand.

antiquary, an'ti-kwar-i, *n.* one who is interested in the past: a collector of relics.—*adj.* **antiquāri'an**, having to do with ancient times, customs, etc.—*n.* one who studies these.

antique, an-tēk', *adj.* old, but to be admired.—*n.* anything very old: an ancient relic.—*n.* **antiquity** (an-tik'wi-ti), ancient times, esp. those of the Greeks and Romans: great age.—*adj.* **an'tiquated**, grown old, or out of fashion.

antiseptic, an-ti-sept'ik, *adj.* germ-destroying.—*n.* something which destroys germs and so prevents disease.

antithesis, an-tith'e-sis, *n.* thoughts or words set in opposition: the opposite.

antitox'in, *n.* a substance in the blood able to fight against certain poisons.

ant'lers, *n.pl.* the horns of a deer.

an'vil, *n.* an iron block on which smiths hammer metal into shape.

anxious, angk'shus, *adj.* worried about what may happen.—*n.* **anxiety** (ang-zī'i-ti), state of being anxious.

aorta, ā-or'ta, *n.* a great blood-vessel leading from the heart.

apace, a-pās', *adv.* at a quick pace: fast.

apart'ment, *n.* a separate room in a house: rooms in a house set aside for the use of people other than those living there always: lodging.

apathy, ap'ath-i, *n.* want of feeling or interest.—*adj.* **apathet'ic.**

ape, āp, *n.* a monkey, especially gorilla, chimpanzee, orang-utan, or gibbon: a person who imitates another foolishly.—*v.* to imitate.

aperient, a-pē'ri-ent, *n.* any laxative or opening medicine.

aperture, a'pert-ūr, *n.* an opening: a hole.

apex, ā'peks, *n.* the top or summit: the highest point of anything.

aphorism, af'or-izm, *n.* a short, wise saying: an adage.

apiary, āp'i-ar-i, *n.* a place where bees are kept.—*ns.* **ap'iarist**, one who keeps an apiary: one who studies the habits of bees; **apiculture** (ā'pi-cult-ūr), bee-keeping.

apiece, a-pēs', *adv.* for each piece, thing, or person.

aplomb, a-plom', *n.* self-confidence: presence of mind.

Apocalypse, a-pok'al-ips, *n.* the name of the last book of the New Testament.

Apocrypha, a-pok'rif-a, *n.pl.* certain books of the Old Testament not printed in our Bibles: hidden or secret things of which the truth is not certain.—*adj.* **apoc'ryphal**, doubtful: untrue.

apologetic, -al, a-pol-oj-et'ik, -al, *adj.* making excuses: saying one is sorry.

apology, a-pol'oj-i, *n.* an open confession that a wrong has been done.—*v.* **apol'ogise**, to make excuse: to express regret for a fault.

apoplexy, ap′o-pleks-i, *n.* a kind of fit, caused by too much blood in the brain.—*adj.* **apoplec′tic.**

apos′tasy, *n.* breaking away from one's religion, faith, or promises. —*n.* **apost′ate**, one who breaks his vows.

apostle, a-pos′l, *n.* one sent to preach the gospel: one of the twelve disciples of Christ.

apostrophe, a-pos′trof-e, *n.* a sudden turning away from the ordinary course of a speech to address some person or object: a mark (') to show the possessive case (e.g. the boy's knife), or that a letter has been missed out (e.g. one o'clock). —*v.* **apos′trophise**, to speak to by apostrophe.

apothecary, a-poth′ek-ar-i, *n.* a druggist: one who makes up or sells drugs for medicine.

appal, ap-pawl′, *v.* to make afraid: to terrify.—*adj.* **appal′ling**, shocking.

apparatus, ap-par-ā′tus, *n.* set of instruments: tools: material to do a piece of work.

appar′el, *n.* clothing: dress.

apparent, ap-pār′ent or ap-par′ent, *adj.* easily seen: evident.

apparition, ap-par-ish′un, *n.* something which appears suddenly: a ghost.

appeal, ap-pēl′, *v.* to ask earnestly: (in law) to take one's case to a higher court: to be pleasing (to). —Also *n.*—*adj.* **appeal′ing**, imploring, asking earnestly.

appear, ap-pēr′, *v.* to come into view: to seem.—*n.* **appear′ance.**

appease, ap-pēz′, *v.* to quieten by giving what was asked for: to make peaceful.

appell′ant, *n.* one who appeals in a court of law.—*n.* **appellā′tion**, a name: title.

append′, *v.* to hang one thing to another: to add.—*ns.* **appen′dage**, something appended; **appen′dix**, a part added at the end of a book: a small worm-like part of the bowels which, when diseased, causes a painful illness called **appendicī′tis.**

appertain′, *v.* to belong to.

appetite, ap′pet-īt, *n.* hunger: desire for food.—*adj.* **appetis′ing**, tempting to the appetite.—*n.* **appetis′er**, something which makes one feel hungry.

applaud, ap-plawd′, *v.* to praise by clapping the hands: to praise loudly.—*n.* **applause′**, praise loudly given.

apply, ap-plī′, *v.* to lay on (e.g. an ointment): to make a request: to fix the mind on: to be suitable.—*ns.* **applī′ance**, a tool or instrument; **ap′plicant**, one who applies or asks; **applicā′tion**, the act of applying: hard work, diligence: a request: the lesson of a fable.—*adj.* **ap′plicable**, able to be applied: suitable.

appoint′, *v.* to fix: to place in a job (e.g. He was *appointed* manager). —*n.* **appoint′ment**, a job or situation: an arrangement to meet someone.

apportion, ap-pōr′shun, *v.* to divide in fair shares.

apposite, ap′poz-it, *adj.* suitable.

appraise, ap-prāz′, *v.* to set a price on: to value.—*n.* **apprais′er**, one whose work it is to value property.

appreciate, ap-prē′shi-āt, *v.* to be aware of the good points in: to value highly: to understand: to rise in value.—*n.* **apprēciā′tion**, a good opinion of: gratitude.—*adj.* **apprēc′iable**, able to be noticed: of some amount.

apprehend, ap-pre-hend′, *v.* to lay hold of: to seize: to understand. —*n.* **apprehen′sion**, the act of seizing: power to understand: fear.—*adj.* **apprehens′ive**, afraid of something to come.

apprentice, ap-prent′is, *n.* one who is learning a trade: a beginner. —*v.* to take on as an apprentice. —*n.* **apprent′iceship**, the time during which one is an apprentice.

approach, ap-prōch′, *v.* to come near: to be like.—*n.* a coming near to: a path or road leading to a place.—*adj.* **approach′able**, able to be reached: (of persons) pleasant to speak to.

approbation, ap-prob-ā′shun, *n.* a good opinion of.

appropriate, ap-prō′pri-āt, *adj.* suitable.—*v.* to take to one's self as one's own.—*n.* **apprōpriā′tion.**

approve, a-proov′, *v.* to think well of, to be pleased with.—*n.* **approv′al**, good opinion: permission (e.g. I shall do it with your *approval*).—**on approval**, on trial, to test worth (e.g. The shoes were sent to him *on approval*).

approximate, ap-proks′im-āt, *adj.* nearly correct.—*v.* to come near.—*n.* **approximā′tion**, answer to a sum, not exactly correct but correct enough for the purpose.

appur′tenance, *n.* something which belongs to a person or thing.

apricot, ā′pri-kot, *n.* an orange-coloured fruit of the plum kind.

April, ā′pril, *n.* the fourth month of the year.—*n.* **A′pril-fool**, one sent upon a useless errand on the 1st of April.

apron, ā′prun, *n.* cloth or a piece of leather worn before one to protect the dress.

apropos, a-pro-pō′, *adv.* to the purpose: at the right moment: (with *to* or *of*) in connection with.

apse, aps, *n.* the rounded end at the east end of a church.

apt, *adj.* liable: quick: alert: clever.—*ns.* **apt′ness**, fitness; **apt′itūde**, readiness: cleverness.

aquarium, a-kwā′ri-um, *n.* a tank or set of tanks for keeping fish or water animals:—*pl.* **aquā′ria.**

aquatic, a-kwat′ik, *adj.* having to do with water: living or growing in water.

aqueduct, ak′we-dukt, *n.* a channel by which water is led from one place to another: a bridge for taking water, such as a canal, across a valley.

aqueous, ā′kwe-us, *adj.* watery: (of rocks) laid down by water.

aquiline, ak′wil-īn, *adj.* like an eagle: curved or hooked, like an eagle's beak.

arable, ar′a-bl, *adj.* fit for ploughing.

ar′biter, *n.* someone chosen to settle a quarrel by giving a decision: a judge.—*v.* **ar′bitrate**, to act as a judge: to decide.—*ns.* **arbitrā′tion**, the act of deciding: a decision; **ar′bitrātor**, a judge.

arbitrary, ar′bi-trar-i, *adj.* not fixed by rules: uncertain.

arboreal, ar-bō′re-al, *adj.* like a tree: living in trees.—*ns.* **arborē′tum**, a park or garden in which different kinds of trees are grown; **ar′boricul′ture**, tree-growing.

arbour, ar′bur, *n.* a seat in a garden shaded by tree-branches, bushes, or creepers: a bower.

arc, ark, *n.* a curve.

arcade, ark-ād′, *n.* a row of arches supported by pillars: a passage or road under a row of arches, often with shops along the side.

arch, *n.* the curved part above one's head in a gateway or between pillars.—*v.* to cover with an arch: to shape like an arch.—*adj.* **arched.**—*n.* **arch′way**, a passage or road beneath an arch, such as that leading into a castle.

arch, *adj.* cunning.

archæology, ark-ē-ol′oj-i, *n.* the study of the people of long-past times from what remains of their buildings, etc.—*adj.* **archæolog′ical.**—*n.* **archæol′ogist**, one who studies archæology.

archaic, ark-ā′ik, *adj.* ancient: out of date: (of words) no longer used (e.g. *eftsoons*=soon afterwards).—*n.* **ar′chāism**, a word now out of use.

archangel, ark-ān′jel, *n.* a chief among angels.

archbish′op, *n.* a chief bishop, having other bishops under his rule.—*n.* **archbish′opric**, the rank of an archbishop: the district under an archbishop.

archdeacon, arch-dē′kn, *n.* the chief of the assistants of a bishop.

archduke, arch-dūk′, *n.* the title of certain princes who are higher than dukes:—*fem.* **archduch′ess.**—*adj.* **archdū′cal**, belonging to an archduke.—*n.* **archduch′y**, the land owned by an archduke.

arch-enemy, *n.* the chief enemy: Satan.

arch′er, *n.* one who shoots with a bow and arrows.—*n.* **arch′ery**, the art of shooting with the bow.

archipelago, ark-i-pel′a-gō, *n.* a sea having many small islands: a group of small islands.

architect, ark′i-tekt, *n.* one who plans buildings.—*n.* **architect′ure**, the style or fashion in which a building has been made: the study of building.

archives, ark'īvz, *n*. the place in which government papers are kept: government papers.

arctic, ark'tik, *adj*. belonging to the district round the North Pole: very cold.—**Arctic Circle**, a circle drawn on the map round the North Polar regions.

ard'ent, *adj*. fiery: eager.—*n*. **ard'our**, eagerness.

arduous, ard'ū-us, *adj*. difficult.—*n*. **ard'uousness**.

area, ā'rē-a, *n*. the amount of surface in anything, usually given in acres, square miles, square yards, etc.: a shut-in space, such as that round the bottom of a building.

arē'na, *n*. the sanded space where gladiators fought: any place where a big fight or show is held.

argosy, ar'go-si, *n*. a large trading-ship with a valuable cargo.

argue, arg'ū, *v*. to try to prove by giving reasons: to talk excitedly: to quarrel in words.—*n*. **ar'gument**, a collection of one's reasons given as proof: a heated talk: the summary of a book.—*adj*. **argument'ative**, fond of arguing.

ar'id, *adj*. dry.—*ns*. **arid'ity**, **ar'idness**.

arise, a-rīz', *v*. to rise up: to come into view or hearing.

aristocracy, ar-is-tok'ras-i, *n*. the government of a country by the nobles or persons of rank: nobles and persons of rank.—*n*. **aristocrat** (ar'is-to-krat or ar-is'-), a nobleman: a haughty person. —*adj*. **aristocrat'ic**.

arithmetic, ar-ith'met-ik, *n*. that part of learning dealing with numbers and counting.—*adj*. **arithmet'ical**.—*n*. **arithmetic'ian**, one good at arithmetic.

ark, *n*. a chest or box (e.g. that in which the Israelites kept the Tables of the Law): the boat in which Noah and his family lived during the Flood.

arm, *n*. the part of the body between the shoulder and the hand: anything jutting out (e.g. an inlet of the sea, a rail at the side of a chair).—*ns*. **arm'chair**, a chair with arms or rests at each side; **arm'let**, a band round the arm; **arm'-pit**, the hollow under the shoulder.

arm, *n*. a weapon:—*pl*. **arms**, weapons for fighting: a crest or badge belonging to noble families. —*v*. to fit or supply with weapons.—*adj*. **armed**, fitted or supplied with weapons.

armada, ar-mā'da or ar-ma'da, *n*. a fleet of warships or warplanes (e.g. the fleet of warships sent by Spain against England in 1588).

armadill'o, *n*. a small American animal whose body is protected by broad bands of bone.

arm'ament, *n*. the guns of a warship, tank, or aeroplane.

armistice, arm'ist-is, *n*. in war, a rest from fighting for the time being (e.g. to bury the dead, or to arrange for the making of peace).

armō'rial, *adj*. having to do with a coat-of-arms or family crest.

armour, arm'ur, *n*. a steel suit worn by knights in olden times: an army's tank forces.—*n.s*. **arm'our-bearer**, one who carried a knight's armour; **arm'ourer**, one who makes, mends, or looks after arms; **arm'oury**, an arms store. —*adj*. **arm'our-plat'ed**, protected by plates of steel.

army, arm'i, *n*. a large number of men armed for war: a number of men gathered together for some special reason.

arō'ma, *n*. sweet smell.—*adj*. **aromat'ic**, sweet-smelling.

around, a-rownd', *prep*. on all sides of.—*adv*. on every side.

arouse', *v*. to awaken: to stir up.

A.R.P., short for *Air Raid Precautions*, i.e. the steps taken to protect people against bombs from aeroplanes.

arquebus, ar'kwi-bus, *n*. an old-fashioned musket—also **har'quebus**.—*n*. **arquebusier'**, a soldier armed with an arquebus.

arraign, ar-rān', *v*. to accuse.—*n*. **arraign'ment**, a trial in court.

arrange, ar-rānj', *v*. to set in a rank or row: to put in order: to plan. —*n*. **arrange'ment**, act of setting in order: a plan to do something.

ar'rant, *adj*. very bad.

ar'ras, *n*. a screen of tapestry.

array′, *n.* order: dress.—*v.* to put in order: to dress.
arrear, ar-rēr′, *n.* that which is in the rear or behind: that which remains unpaid or undone (used mostly in *pl.*).
arrest′, *v.* to seize, esp. by power of the law: to stop: to catch (the attention).—*n.* capture by the police: stoppage.
arrive, ar-rīv′, *v.* to reach any place.—*n.* **arrīv′al**, the act of arriving: persons or things that arrive.
ar′rōgant, *adj.* taking too much power or importance for one's self: proud and haughty.—*n.* **ar′rogance.**
arrow, ar′rō, *n.* a straight, pointed weapon, made to be shot from a bow.
arrowroot, ar′rō-root, *n.* a starchy food.
ar′senal, *n.* a factory or store for the weapons, ammunition, etc. of a navy or army.
arsenic, ar′sen-ik, *n.* a poisonous chemical.
ar′son, *n.* the crime of setting fire to anything to get money from insurance: fire-raising.
art, *n.* cleverness, skill: drawing, painting, sculpture, etc.:—*pl.* learning, as in the phrase *Master of Arts.*—*adjs.* **art′ful**, wily: cunning; **art′less**, simple.
artery, ar′ter-i, *n.* a tube which carries blood from the heart to pass through the body.—*adj.* **artēr′ial**, belonging to an artery: like an artery.—**artērial road**, the main traffic road among narrower roads.
artesian, ar-tē′zhan, an adjective used to describe wells made by boring until water is reached.
artichoke, ar′ti-chōk, *n.* a thistle-like plant, part of whose flower-head is eaten.—**Jerusalem artichoke**, a plant whose root is eatable.
article, art′i-kl, *n.* a thing, object: a composition in a newspaper, journal, etc.: each separate part of a treaty or an agreement: (*pl.*) an agreement or set of rules.
articulate, ar-tik′ūl-āt, *adj.* distinct: clear.—*v.* to join together: to speak distinctly.—*n.* **articulā′tion**, a putting or joining together, esp. of sounds in speaking: way of speaking.
artifice, art′i-fis, *n.* a cunning trick.—*n.* **artif′icer**, a worker.—*adj.* **artific′ial**, not natural, made by man: not real.—*n.* **artificial′ity.**
artillery, ar-til′er-i, *n.* cannon: the part of the army that manages the cannon.
artisan, art-i-zan′, *n.* one good at an art or trade: a workman.
art′ist, *n.* one who is good at painting, sculpture, etc.—*adj.* **artis′tic**, having to do with art: beautiful: loving beautiful things.—*n.* **art′istry**, skill as an artist.
artiste, ar-tēst′, *n.* one clever or tasteful in any art, as a cook, a hairdresser, etc.: someone who performs in public (e.g. a film star, concert singer).
asbes′tos, *n.* a fibrous or thread-like mineral which resists heat.
ascend, as-send′, *v.* to climb: to rise or slope upwards.—*ns.* **ascend′ency, ascend′ancy**, power over others: mastery; **ascent′**, a going up: a slope upwards; **ascen′sion**, a going up.—**Ascension Day**, the day on which the Church remembers Christ's ascent to Heaven (i.e. Holy Thursday).
ascertain, as-ser-tān′, *v.* to find out: to make certain.—*adj.* **ascertain′able.**
ascetic, as-set′ik, *n.* one who, in his manner of living, keeps away from all kinds of pleasure: a strict hermit.—*n.* **ascet′icism.**
ascribe, a-skrīb′, *v.* to give praise or blame to somebody for something (e.g. The general *ascribed* the victory to the bravery of his soldiers).—*n.* **ascrip′tion.**
ash, *n.* a hard-wood tree.
ash or **ash′es**, *n.* what is left after anything is burnt.—*adj.* **ash′en**, pale, like the colour of ashes.—**Ash-Wednesday**, the first day of Lent.
ashamed, a-shāmd′, *adj.* feeling shame.
ash′lar, *n.* building-stone cut and shaped ready for use.
ashore, a-shōr′, *adv.* on shore.
Asiatic, ā-zhi-at′ik, **Asian**, āzh′yan, *adj.* belonging to Asia.

aside, a-sīd′, *adv.* on or to one side: apart.—*n.* words spoken in a low voice, so as not to be heard by others present.

asinine, as′in-īn, *adj.* of or like an ass: stupid.

askance, a-skans′, *adv.* sideways: with a side glance.—**to look askance at**, to look at with distrust.

askew, a-skū′, *adv.* off the straight: to one side.

asp, *n.* a small poisonous snake.

aspar′agus, *n.* a plant whose young shoots are eaten as a vegetable.

as′pect, *n.* look: view: outlook.

asp′en, *n.* a kind of poplar tree.

asper′ity, *n.* roughness: harshness of temper: crabbedness.

aspersion, as-per′shun, *n.* an untrue or spiteful statement about a person.

asphalt, as′falt, *n.* a tarry substance used to make pavements, paths, etc.: pitch.—*v.* **as′phalt**, to lay or cover with asphalt.

asphyxia, as-fik′si-a, *n.* a stoppage in breathing: suffocation (by smoke or other fumes).—*v.* **asphyx′iāte**, to suffocate.—*n.* **asphyxiā′tion.**

aspidistra, as-pid-ist′ra, *n.* a pot-plant with large leaves.

aspire, as-pīr′, *v.* to aim at high things (e.g. prizes, jobs): to be ambitious.—*ns.* **aspirant** (as-pīr′-ant or as′pir-ant), one who tries hard (e.g. for a prize, a job): a candidate; **aspirā′tion**, eager desire or longing.

as′pirin, *n.* a soothing drug.

ass, *n.* a donkey: a stupid person.

assagai, assegai, as′sa-gī, *n.* a thin wooden spear, with an iron tip.

assail, as-sāl′, *v.* to attack: to leap out upon.—*n.* **assail′ant**, one who attacks.

assass′in, *n.* one who, usually for money, kills by surprise.—*v.* **assas′sinate**, to murder by sudden and secret attack.—*n.* **assassinā′tion.**

assault, as-sawlt′, *n.* an attack with blows or weapons.—*v.* to make an assault or attack upon.

assay′, *v.* to find the amount of pure metal in a lump of raw metal, or in a mixture containing metal.

assem′ble, *v.* to bring or put together: to meet together.—*n.* **assem′bly**, a meeting of persons, esp. one to talk over church or government affairs.

assent′, *v.* to agree.—*n.* permission: a statement, in words or writing, that one agrees (e.g. All our laws must have the queen's *assent*).

assert′, *v.* to say firmly.—*n.* **asser′tion**, a strong claim or statement.—*adj.* **asser′tive**, not shy.—**to assert one's self**, to push one's self forward, to make one's self noticed.

assess′, *v.* to fix an amount to be paid, esp. of a tax.—*ns.* **assess′ment**, the amount fixed; **assess′or.**

as′sets, *n.pl.* the money with which one may pay one's debts.—**a great asset**, a great help.

asseverate, as-sev′er-āt, *v.* to declare solemnly.—*n.* **asseverā′tion.**

assiduity, as-sid-ū′i-ti, *n.* eager attention to what one is doing: diligence.—*adj.* **assid′ūous**, persevering: hard-working.

assign, as-sīn′, *v.* to give to someone as his share: to fix (e.g. The judge *assigned* a day for the trial).—*n.* **assign′ment**, a fixed amount of work or study to be done.

assim′ilate, *v.* to digest (food).—*n.* **assimilā′tion.**

assist′, *v.* to help: to be present at.—*ns.* **assist′ance**, help: aid; **assist′ant**, a helper.

assizes, as-sīz′es, *n.pl.* the name of certain law courts in England.

associate, as-sō′shi-āt, *v.* to join with, as a friend or partner.—*adj.* **assō′ciate**, joined or connected with.—*ns.* **assō′ciate**, a friend, partner, companion; **assōciā′tion**, a number of persons gathered together for a purpose.—**Association football**, the game played under the rules of the Football Association, with eleven players a side (not fifteen as in *Rugby*).

assort′, *v.* to divide into kinds: to arrange: to match, well or ill (e.g. an *ill-assorted* pair).—*adj.* **assort′ed**, arranged in sorts: mixed.—*n.* **assort′ment**, a collection of different sorts of a thing: a mixture of kinds.

assuage, as-swāj′, *v.* to soothe (e.g. pain, hunger, thirst).
assume, as-sūm′, *v.* to take upon one's self: to take for granted: to pretend to possess.—*adj.* **assumed′**, taken to one's self: pretended.—*adj.* **assum′ing**, haughty: proud.—*n.* **assumption** (as-sum′shun), act of assuming: something taken as being true, without proof.
assure, a-shoor′, *v.* to make sure: to give confidence.—*n.* **assur′ance**, sureness: a promise.—*adj.* **assured** (a-shoord′), certain.
as′terisk, *n.* a star (*) used in printing to point to a note at the bottom or at the side of the page.
astern′, *adv.* in the back part of a ship: backwards.
asthma, as(th)′ma, *n.* an illness with great shortness of breath.—*adj.* **asthmat′ic**, *suffering from asthma*: panting: short-winded.
astir′, *adv.* on the move: out of bed.
aston′ish, *v.* to strike with sudden surprise or wonder: to amaze.—*n.* **aston′ishment**, amazement: wonder.
astound, as-townd′, *v.* to amaze: to strike dumb with wonder.—*adj.* **astound′ing**.
astrakhan, as-tra-kan′, *n.* lamb-skin with a curled wool.
as′tral, *adj.* belonging to the stars.
astray′, *adv.* out of the right way.
astride, a-strīd′, *adv.* sitting with the legs apart, like a rider on horse-back.
astringent, as-trin′jent, *n.* something which draws together (e.g. certain medicines, ointments, etc. used to draw together the cut parts of a wound).
astrology, as-trol′o-ji, *n.* the study of the stars in order to tell the future.—*n.* **astrol′oger**, one who foretells good or bad fortune from the stars.
astron′omy, *n.* the study of the stars and their movements.—*n.* **astron′omer**.
astūte′, *adj.* cunning: careful about one's own affairs.
asun′der, *adv.* apart: into parts.
asylum, a-sīl′um, *n.* a place of refuge or safety: a home for blind or weak-minded persons.
atheism, ā′the-izm, *n.* belief that there is no God.—*n.* **a′theist**, one who does not believe in a God.—*adj.* **atheist′ic**.
atheling, ath′el-ing, *n.* in old-time England, a prince of the royal family (e.g. Edgar, the *Atheling*).
athirst′, *adj.* thirsty: eager for.
athlete, ath′lēt, *n.* one of strong body: one good at sports (running, leaping, etc.).—*adj.* **athlet′ic**, having to do with games: strong, vigorous.—*n.pl.* **athlet′ics**, running, games, etc.
athwart′, *prep.* across.—*adv.* sidewise: wrongly.
at′las, *n.* a book of maps.
atmosphere, at′mo-sfēr, *n.* the air round the earth: the air in a room: feeling (e.g. There is a friendly atmosphere in this class).—*adj.* **atmospher′ic**.—*n.pl.* **atmospher′ics**, *in wireless, air disturbances causing crackling noises.*
atoll, a-tol′ or at′ol, *n.* a coral island or reef.
at′om, *n.* the tiniest possible part of any substance: anything very small.—**atomic energy**, very great force got by breaking up the atoms of some substances; it is used in the *atomic bomb*.
atone′, *v.* to make up for wrongdoing.—*n.* **atone′ment**.
atrocious, a-trō′shus, *adj.* cruel or wicked: very bad.—*n.* **atrocity** (a-tros′i-ti), a cruel deed.
atrophy, at′rof-i, *n.* a wasting away (esp. of the body or part of it).
attach′, *v.* to tie to: to connect.—*adj.* **attached′**, fastened, fixed: fond of.—*n.* **attach′ment**, something fastened: liking for.
attaché, at-tash′ā, *n.* a junior ambassador.—*n.* **attaché-case**, a small case for papers, etc.
attack′, *v.* to fall upon suddenly or violently: to begin a fight: (of a disease) to begin to affect.—Also *n.*
attain′, *v.* to reach.—*adj.* **attain′able**, able to be reached.—*n.* **attain′ment**, act of reaching: the thing reached.—*pl.* **attain′ments**, knowledge: learning.
attainder, at-tān′der, *n.* a punishment by which a pe[illegible] rights as a citizen.

at'tar, *n.* a sweet-smelling oil got from rose petals: a scent.

attempt, at-temt', *v.* to try.—*n.* a trial or effort: an attack (on a person with the purpose of killing him).

attend', *v.* to wait on, or go along with: to be present at: to give attention.—*n.* **attend'ance**, act of waiting on or of being present: the persons present.—*adj.* **attend'ant**, going along with.—*n.* one who attends or goes with: a servant.—*n.* **atten'tion**, heed: politeness: care.—*adj.* **attent'ive**, full of attention: polite: mindful.

attenuate, at-ten'ū-āt, *v.* to make or become thin: to grow less.

attest', *v.* to bear witness to (e.g. by signing one's name).—*n.* **attestā'tion.**

at'tic, *n.* a room in the roof of a house.

attire', *v.* to dress.—*n.* dress.

attitude, at'ti-tūd, *n.* position of the body: manner of behaving.

attorney, at-tur'ni, *n.* one who has power to act for another: a lawyer who prepares cases for a court of law.—*n.* **attor'ney-gen'eral**, the chief lawyer in the government.

attract', *v.* to draw to: to entice.—*n.* **attrac'tion**, act of drawing to: the force which draws bodies to each other: that which attracts.—*adj.* **attract'ive**, able to attract: pleasing.

attribute, at-trib'ūt, *v.* to put along with or think of as belonging to.—*adj.* **attrib'utable.**—*n.* **at'tribute**, a point in a person's character (e.g. Thrift is an *attribute* of a Scotsman).

attūne', *v.* to put in tune: to make to agree.

auburn, aw'burn, *adj.* golden or reddish-brown in colour.

auction, awk'shun, *n.* a public sale in which the price is increased step by step, and the article to be sold goes to him who offers the most.—*v.* to sell by auction.—*n.* **auctioneer'**, one who sells by auction.

audacious, aw-dā'shus, *adj.* daring: bold: impudent.—*n.* **audacity** (aw-das'i-ti), boldness: daring.

audible, awd'i-bl, *adj.* able to be heard.—*n.* **audibil'ity.**

audience, awd'i-ens, *n.* the persons gathered within hearing, esp. at a concert or meeting: a hearing (e.g. The minister had an *audience* with the king).

audit, awd'it, *v.* to look into an account to see if it is correct.—Also *n.*—*n.* **aud'itor**, one who is trained to the work of auditing.

auditory, awd'it-or-i, *adj.* having to do with the sense of hearing.—*ns.* **audi'tion**, a test given to a singer or other performer; **audito'rium**, the part of a hall where the hearers (or audience) sit.

auger, aw'ger, *n.* a carpenter's tool used for boring holes in wood.

aught, awt, *n.* anything: a part.

augment', *v.* to increase in size or number: to grow larger.—*n.* **augmentā'tion.**

augur, aw'gur, *n.* among the Romans, one who foretold events from watching how birds behaved: a prophet.—*v.* to foretell from signs.—*n.* **au'gury**, a sign for the future.

august, aw-gust', *adj.* stately.

auk, awk, *n.* a short-winged sea-bird, found in northern seas.

aunt, ant, *n.* a father's or a mother's sister—also the wife of one's uncle.

aureate, awr'i-āt, *adj.* golden or gold-coloured.—*n.* **aureole** (awr'i-ōl), in old paintings, a gold circle round the heads of sacred persons.

auriferous, awr-if'er-us, *adj.* bearing or yielding gold.

aurora, aw-rō'ra, *n.* the dawn: a glow in the sky, probably caused by electricity—the *Aurora Borealis* (bō-rē-ā'lis), or *Northern Lights*, is seen in regions about the North Pole; the *Aurora Australis* (aw-strāl'is), or *Southern Lights*, around the South Pole.

auspice, aw'spis, *n.* a sign got from watching birds.—*adj.* **auspi'cious**, promising success: favourable: lucky.—**under the auspices of**, under the control of (e.g. The sports were *under the auspices of* the School Sports Association).

austere, aws-tēr′, *adj.* harsh: severe: stern.—*ns.* **austere′ness, auster′ity.**
austral, aws′tral, *adj.* southern.
authentic, aw-thent′ik, *adj.* true: reliable: to be believed.—*v.* **authent′icate**, to prove to be true. —*n.* **authenticity** (aw-then-tis′-i-ti), state of being true: truth.
auth′or, *n.* the writer of a book, poem, play, etc.: the beginner of anything:—*fem.* **auth′oress.**
authorise, awth-or-īz, *v.* to give a person power to do something.
authority, awth-or′it-i, *n.* power or right: permission: a person whose opinion is of importance, an expert: a number of persons who, acting together, look after something (e.g. the Port of London *Authority*):—*pl.* **author′ities**, persons in power: the government.—*adj.* **author′itātive**, said by someone whose opinion is important.
autobiography, aw-to-bī-og′raf-i, *n.* a person's life written by himself.
autocrat, aw′to-krat, *n.* a ruler who has full power.—*adj.* **autocrat′ic.**
autograph, aw′to-graf, *n.* one's own handwriting or signature.—*v.* to write one's name.—**autograph album**, book in which one collects signatures of famous people, etc.
automaton, aw-tom′a-ton, *n.* machine that appears to move of itself: person who acts like a machine:—*pl.* **autom′atons** or **autom′ata.**—*adj.* **automat′ic**, self-moving.—*n.* **automation** (aw-to-mā′shun), use in factories, etc., of machines for calculating and for controlling other machines.
automobile, aw-to-mō-bēl′, *n.* a motor-car.
autonomy, aw-ton′om-i, *n.* the power or right of a country to govern itself.—*adj.* **auton′omous.**
autumn, aw′tum, *n.* the third season of the year.—*adj.* **autum′nal**, belonging to autumn.
auxiliary, awg-zil′yar-i, *adj.* helping: additional.—*n.* a helper.
avail, a-vāl′, *v.* to be of use or value.—*n.* benefit: use: service. —*adj.* **avail′able**, able to be made use of.—*n.* **availabil′ity.**
avalanche, av′al-ansh, *n.* a mass of snow and ice sliding down from a mountain.
avarice, av′ar-is, *n.* eager desire for getting and storing up of wealth. —*adj.* **avari′cious**, very greedy.
avenge, a-venj′, *v.* to punish someone for the wrong he has done: to take vengeance for.—*n.* **aven′ger.**
avenue, av′en-ū, *n.* a wide and handsome street: the main road to a mansion-house, usually bordered by trees: a double row of trees.
aver′, *v.* to declare to be true: to state as a fact.—*n.* **aver′ment.**
average, av′er-āj, *n.* the result got by adding several amounts and dividing the total by the number of amounts (e.g. The *average* of 3, 7, 9, 13 is 8 (32÷4)).—*adj.* ordinary: of medium size: not very good.—*v.* to find the average.
averse′, *adj.* not fond of (e.g. I am *averse* to picture-shows).—*n.* **aver′sion**, dislike: something that is hated.
avert′, *v.* to turn aside: to prevent.
aviary, ā′vi-ar-i, *n.* a place for keeping birds.
aviation, ā-vi-ā′shun, *n.* the science of flying (in aeroplanes, airships). —*n.* **a′viātor**, an airman.
avid′ity, *n.* eagerness: greediness.—*adj.* **av′id**, greedy: eager.
avocation, a-vo-kā′shun, *n.* a side-line from one's regular work: a hobby.
avoid′, *v.* to try to escape from: to shun: to leave alone.—*adj.* **avoid′able.**—*n.* **avoid′ance**, the act of avoiding.
avoirdupois, av-or-dū-poiz′, *adj.* and *n.* the system of measuring weights in pounds and ounces (1 lb.=16 oz.).
avouch, a-vowch′, *v.* to say firmly.
avow′, *v.* to declare openly: to admit.—*adj.* **avowed′.**—*n.* **avow′al**, an open statement or confession.
await′, *v.* to wait or look for: to be in store for.
awake′, *v.* to rouse from sleep: to stop sleeping.—*adj.* **awake′**, not asleep: watchful.—*v.* **awak′en**, to rouse from sleep: to open the eyes after sleep.—*ns.* **awak′ing, awak′ening**, the moment of stirring after sleep.

award′, *v.* to give something to someone, after judging.—*n.* judgment: what is awarded (e.g. payment, prize, or punishment).
aware, a-wār′, *adj.* on one's guard: knowing of.
awe, aw, *n.* wonder mixed with fear: dread.—*v.* to strike with fear.—*adjs.* **aw′ful**, causing fear and wonder: (*slang*) ugly; **awe′some**, causing fear; **awe′struck**, full of fear and wonder.—*adv.* **aw′fully**, (*slang*) very.—*n.* **aw′fulness**, dreadfulness.
awhile, a-whīl′, *adv.* for some time: for a short time.
awk′ward, *adj.* clumsy: not graceful: difficult to deal with.—*n.* **awk′wardness**.
awl, *n.* a pointed tool for boring small holes in leather.
awn′ing, *n.* a covering (e.g. of canvas) to give shelter from the sun's rays.
awry, a-rī′, *adj.* twisted to one side: crooked.—*adv.* unevenly.
axe, *n.* a tool for hewing or chopping:—*pl.* **ax′es**.
axiom, aks′yum, *n.* a statement usually taken to be true and needing no proof.—*adj.* **axiomat′ic**, easily seen to be true.
ax′is, *n.* the line, real or imaginary, on which a thing turns, e.g. the *axis* of the earth, i.e. the line (joining the North Pole and South Pole) around which the earth turns:—*pl.* **axes** (aks′ēz).
axle, aks′l, **axle-tree**, *n.* the pin or rod on which a wheel turns.
ay, aye, ī, *adv.* yes: indeed.
ayah, ī′ya, *n.* a native Indian waiting-maid or nurse-maid.
aye, ay, ā, *adv.* ever: always: for ever.—**for aye**, for ever.
azure, āzh′ūr, *adj.* sky-blue.—*n.* the clear blue sky: sky.

B

bab′ble, *v.* to speak like a baby: to tell secrets.—*ns.* **bab′ble, bab′bling**, silly talk: murmuring (as of a stream flowing over stones); **bab′bler**.
bā′bel, *n.* a jumble of sounds.
baboo, babu, ba′boo, *n.* an Indian who has learned English but does not write it quite correctly.
baboon′, *n.* a kind of large monkey.
baby, bā′bi, *n.* a very young child: an infant.—*n.* **babyhood** (bā′bi-hood), the time when one is a baby.
bach′elor, *n.* an unmarried man: one who has passed certain examinations at a university (e.g. *Bachelor of Arts*, usually written B.A.): a young knight.—*n.* **bach′elor's-but′ton**, a name for many kinds of flowering plants having button-like flowers (e.g. certain kinds of buttercups).
bacillus, ba-sil′us, *n.* a rod-shaped kind of germ:—*pl.* **bacil′li**.
back, *n.* the hinder part of anything: one who plays in front of the goal in some team-games (e.g. football, hockey).—*adj.* belonging to or placed in the hinderpart.—*adj.* **back′ward**, moving towards the back: shy: not very clever.—*adv.* **back′ward, back′wards**, towards the hinder part—opposite of *forward, forwards*.—*n.* **back′wardness**.—*v.* **back**, to move backwards: to help or support.—*ns.* **back′er**, one who helps or supports; **back′ing**, help or support.—*v.* **back′bite**, to speak evil of anyone behind his back or in his absence.—*ns.* **back′bone**, the bone of the back: the main support of anything: firmness; **back′-door**, a door in the back part of a building; **back′-end**, the late autumn; **back-fire′** (in motors), a loud noise in the exhaust-pipe; **back′ground**, the space behind the principal figures of a picture; **back′-hand**, handwriting with the letters sloped backwards (to the left); **back′-number**, an old copy of a newspaper or magazine: something out of date; **back′slider**, one who turns from good to bad behaviour; **back′-wash**, a backward current, such as that of a wave going out; **back′water**, water held back by a dam: a quiet part of a river: the swell of the sea formed by the passing

of a steamship; (*pl.*) **back'woods,** the part of a country not yet cleared of forests.
backgam'mon, *n.* a game something like draughts, played with dice.
back'ward, back'wards, *adv.* See back.
bā'con, *n.* pig's flesh salted and dried.
bacterium, bak-tē'ri-um, *n.* a kind of germ found in the air, water, earth, in living and dead bodies, and usually in things going bad: —*pl.* **bactē'ria.**—*adj.* **bacte'rial.**—*ns.* **bacteriol'ogy,** the study of bacteria; **bacteriol'ogist.**
badge, *n.* a mark or sign or brooch-like ornament by which a person is known.
badger, baj'er, *n.* a burrowing animal about the size of a fox. —*v.* to pester or annoy.
badinage, bad'in-äzh, *n.* playful talk.
bad'minton, *n.* a game something like tennis, played with shuttle-cocks.
bad'-tempered, *adj.* cross.
baffle, baf'l, *v.* to check or make useless: to be too difficult or too clever for (e.g. This sum *baffles* me; the thief *baffled* the detective).
bag, *n.* a sack, pouch: the quantity of fish or game caught.—*v.* to bulge: to seize or steal.
bagatelle, bag-a-tel', *n.* a board-game, in which balls are struck into numbered holes: a trifle.
bag'gage, *n.* the tents and stores of an army: luggage.
bag'pipe, *n.* a musical instrument made up of a bag and several pipes. (It is played by the bands of Highland regiments.)
bail, *n.* one who gets an untried prisoner out of prison for the time being by promising that the prisoner will come back for trial when sent for: money put down for the prisoner's release.
bail, *n.* in cricket, one of the cross pieces on the top of the wickets.
bail, *v.* to clear (a boat) of water with shallow buckets.
bail'ey, *n.* the outer court of an old castle.
bail'ie, *n.* in Scotland, a member of a town council, above a councillor.
bail'iff, *n.* one who acts for a sheriff: an estate or farm manager.
bait, *n.* food put on a hook to make fish bite: anything tempting.—*v.* to put bait on a hook or trap: to set dogs on to worry another animal (e.g. a bear): to worry, annoy.
baize, *n.* a coarse woollen cloth.
bake, *v.* to cook by the heat of the sun or of fire: to make bread or other food in an oven: to work as a baker.—*ns.* **bake'house, bā'kery,** a place used for baking in; **bā'ker,** a person who bakes or sells bread.
balalaika, ba-la-lī'ka, *n.* a Russian musical instrument, like a guitar.
bal'ance, *n.* a weighing-machine: the money needed to make the two sides of an account equal.—*v.* to be the same in weight: to make both sides of an account the same: to keep from falling.
balcony, balk'on-i, *n.* a platform built out from the wall of a building: an upper floor or gallery in theatres, cinemas, etc.
bald, bawld, *adj.* without hair: bare.
bald'erdash, *n.* nonsense.
baldric, bawld'rik, *n.* a cross-belt from shoulder to waist, for carrying sword, bugle, etc.
bale, *n.* a bundle of goods.
bale, *n.* evil: woe.—*adj.* **bale'ful.**
balk, baulk, bawk, *n.* a line of turf between ploughed land: a wooden beam for building.—*v.* to avoid: to cheat or dodge.
ball, *n.* anything round: the round object used in playing many games: a bullet.
ball, *n.* dancing.—*n.* **ball'room.**
bal'lad, *n.* a simple story-poem usually in verses of four lines: a short song.—*n.* **bal'ladist,** a writer or singer of ballads.
bal'last, *n.* sand, gravel, etc., put into a ship or truck, to steady it.
ballet, bal'lā, *n.* dancing to music on the stage of a theatre.
balloon', *n.* an air-tight ball of thin rubber, silk, etc., which floats in the air when filled with light gas. —*n.* **balloon'ist,** one who goes up in the air in a balloon.—**balloon barrage,** a network of wires supported by balloons, used as a defence against aeroplanes.

bal'lot, *n.* a way of voting in secret by putting a ball or ticket or paper into a box.—*v.* to vote by ballot: to choose by secret voting.—*n.* **ball'ot-box,** the box used for voting by ballot.

balm, bahm, *n.* a sweet-smelling healing ointment: a scent.—*adj.* **balmy** (bah'mi), sweet-smelling: mild.—*n.* **balm'iness.**

balmor'al, *n.* a kind of Scottish cap.

balsam, bawl'sam, *n.* a kind of plant: an oily substance with sweet smell and healing powers.

bal'uster, *n.* a post holding up the rail of a staircase, etc.—*n.* **bal'ustrade,** a row of balusters joined by a rail.

bamboo', *n.* the hard stem of a very tall Indian grass, used for canes, rods, etc.

bamboo'zle, *v.* to trick: to puzzle.

ban, *n.* an order forbidding something, or commanding someone to leave a country: a curse.—*v.* to forbid: to order someone out of a country.

band, *n.* that by which loose things are held together: a strip of cloth to bind round anything, as a hat-band, waist-band, etc.—*ns.* **band'age,** a strip of cloth for protecting a hurt or sore; **band'box,** a light kind of box for holding bands, caps, etc.

band, *n.* a number of persons gathered together for any purpose: a number of musicians playing together.—*v.* to join together.

bandan'a, *n.* a spotted silk or cotton handkerchief, gaily coloured.

bandeau, ban'dō, *n.* a narrow band worn by women to keep the hair in position (esp. at games).

ban'dicoot, *n.* an Australian animal, like a very large mouse: in India and Ceylon, a large kind of rat.

ban'dit, *n.* an outlaw: a robber.

bandolier', bandoleer', *n.* a belt across the body for carrying cartridges.

ban'dy, *v.* to toss from one to another.—**to bandy words,** to exchange angry words: to argue.—*adj.* **ban'dy-legged,** having bent or bow legs.

ban'dy, *n.* in India, a kind of carriage or bullock-cart.

bane, *n.* ruin: great harm: poison.—*adj.* **bane'ful,** deadly: harmful.

bangle, bang'gl, *n.* a ring worn on arms or legs.

ban'ian, ban'yan, *n.* an Indian fig-tree.

ban'ish, *v.* to order to leave a country: to drive away.—*n.* **ban'ishment.**

ban'ister, *n.* the posts and rail along the edge of a staircase.

ban'jo, *n.* a musical instrument like a guitar, having a long neck and a round body.—*n.* **banjō'ist.**

bank, *n.* a mound of earth: the edge of a river, etc.: a seat for rowers: a place where money is put for safety.—*v.* to put earth round: to cover up a fire with coal, so that it will not burn away quickly: to put money in a bank: to tilt an aeroplane for a turn.

bank'rupt, *n.* one who is unable to pay what he owes.—Also *adj.*—*n.* **bank'ruptcy.**

ban'ner, *n.* an army flag: a flag carried in processions.

ban'nock, *n.* a flat home-made cake of oatmeal, barley, or pease-meal.

banns, *n.pl.* a public notice saying that a marriage is to take place.

banquet, bangk'wet, *n.* a feast.

ban'shee, *n.* a wailing Irish ghost.

ban'tam, *n.* a small kind of fowl.

ban'ter, *v.* to tease in fun: to joke or jest at.—Also *n.*

baobab, bā'o-bab, *n.* a splendid tree of Western Africa.

baptise', *v.* to christen, give a name to.—*n.* **bapt'ism,** dipping in, or sprinkling with water as a sign of being taken into the Christian Church.—*adj.* **baptis'mal.**

bar, *n.* a rod of anything solid: something standing in the way, a hindrance (e.g. a bank of sand, gravel, etc. lying at the mouth of a river): the counter across which drinks are served in a public-house: the wooden rail at which prisoners stand for trial: the lawyers in a court: a division in music: a band across a shield.—*prep.* except.—*v.* to fasten with a bar: to hinder or shut out.

barb, *n.* the backward prong or spike on an arrow, fish-hook, or

wire.—*adj.* **barbed** (barbd), having a barb or barbs (e.g. **barbed-wire**).

bar'barous, *adj.* savage: brutal.—*ns.* **bar'barism, barbar'ity,** a rough, lawless way of living: cruelty; **barbā'rian,** a rough ill-mannered fellow.

barbecue, barb'ekū, *n.* a frame on which to dry and smoke meat above a fire: an animal roasted whole.

bar'bican, *n.* a tower jutting out over the gate of a castle.

barcarole, bar'ka-rōl, *n.* a song of the boat-men of Venice.

bard, *n.* in olden times, one who sang war-songs, etc.: a poet.

bare, *adj.* uncovered: naked: open to view.—*adv.* **bare'ly,** hardly, scarcely.—*v.* to strip or uncover.—*adj.* **bare'faced,** impudent.

bar'gain, *n.* an agreement about buying or selling something: something bought cheaply.—*v.* to make an agreement: to argue about a price: to expect (e.g. I did not *bargain* for such wet weather).—**into the bargain,** over and above; **to strike a bargain,** to agree about a price.

barge, *n.* flat-bottomed boat for carrying goods, used on rivers and canals.—*v.* to move clumsily or roughly.—*n.* **bar'gee,** one who owns or works on a barge.

bar'itone, *n.* in singing, a man's voice between high (tenor) and low (bass).

bark, *n.* the cry made by a dog, wolf, etc.—*v.* to yelp like a dog.

bark or **barque,** bark, *n.* a three-masted sailing vessel: a boat.

bark, *n.* the rind or covering of the trunk and branches of a tree.—*v.* to strip or peel the bark from: to rub off (skin).

bar'ley, *n.* a grain used for food, and for making beer and whisky.

barn, *n.* a building in which grain, hay, etc. are stored.

barnacle, bar'na-kl, *n.* a shellfish which sticks to rocks and the bottoms of ships.

barom'eter, *n.* an instrument which measures the weight or pressure of the air and shows changes of weather.—*adj.* **baromet'ric.**

bar'on, *n.* a nobleman's title.—*ns.* **bar'oness,** a baron's wife; **bar'ony,** the land of a baron.—*adj.* **barō'nial.**

bar'onet, *n.* a title ('Sir').—*n.* **bar'onetcy,** the rank of baronet.

barque. Same as **bark.**

bar'rack, *n.* (usually in *pl.*) a place for housing soldiers.—*v.* to shout insults at.

barrage, bar'āj, *n.* a bar across a river to make the water deeper: machine-gun or artillery fire barring the approach to a place.

bar'rel, *n.* a wooden cask or vessel with curved sides: the metal tube of a gun through which the shot is fired.

bar'ren, *adj.* unfruitful: not giving a profit.—*n.* **bar'renness.**

barricade, bar'ik-ād, *n.* a barrier to keep back an enemy.—*v.* to put up a barrier: to make strong for defence.

bar'rier, *n.* something standing in the way (e.g. a strong fence to keep back a crowd).

bar'rister, *n.* a lawyer who defends people in court.

bar'row, *n.* a small hand-cart.

bar'row, *n.* a mound raised over graves in former times.

bar'ter, *v.* to give one thing in exchange for another.—*n.* trading by exchange of goods, instead of buying and selling.

bart'isan, bart'izan, *n.* a small over-hanging turret.

basalt, bas-awlt', *n.* a hard, dark-coloured rock thrown up as lava from volcanoes.—*adj.* **basalt'ic.**

base, *n.* that on which a thing rests: a starting-place or stopping-place in games: place from which supplies and extra men are sent to a fighting army.—*v.* to use as a foundation (e.g. I *base* my opinion on what I have heard).—*adj.* **base'less,** without a foundation: untrue.—*n.* **base'ment,** the lowest storey of a building, esp. the storey below ground-level.

base, *adj.* low: mean: worthless.

base'-ball, *n.* a ball game, something like rounders, played in America.

bash, *v.* to beat or smash in.—Also *n.*

bash'ful, *adj.* shy.

basilisk, baz′il-isk, *n.* in fables, a beast whose look or breath killed: a kind of dragon.
basin, bās′n, *n.* a shallow dish: any large hollow holding water (e.g. a dock): the land drained by a river and its tributaries.
basis, bās′is, *n.* that on which a thing rests: the foundation or beginning:—*pl.* bās′es.—*adj.* bās′ic.
bask, *v.* to lie in warmth.
bas′ket, *n.* a vessel made of plaited twigs or rushes.
bas-relief, ba-re-lēf′, *n.* in sculpture and carving, figures which stand out a little from the ground on which they are formed.
bass, bās, *n.* the low part in music: a male singer with a deep voice.—*adj.* low or deep in tone.
bass, basse, bas, *n.* a fish like the perch.
bassoon′, *n.* a musical instrument with low notes, played by blowing.
baste, bāst, *v.* to beat with a stick: to drop fat or butter over meat while roasting to keep it from burning: to sew loosely together with big stitches: to tack.
bastinado, bast-in-ād′o, *v.* to beat the soles of the feet with a stick.
bastion, bast′yun, *n.* a kind of tower at a bend in the wall of a fort.
bat, *n.* a shaped piece of wood for striking a ball in some games.—*v.* to use the bat in cricket.—*ns.* **bats′man,** one who wields the bat at cricket, etc.
bat, *n.* a flying animal with a mouse-like body.
batch, *n.* the quantity of bread baked at one time: a set, group, or bundle.
bā′ted, *adj.* lowered (e.g. *bated* breath).
bath, *n.* a vessel or other place containing water in which the body is washed.—*v.* to wash the body in a bath.
bāthe, *v.* to plunge in deep water (e.g. river, lake, sea): to wash water gently over (a hurt).—*n.* **bāth′er.**
bat′man, *n.* an army officer's servant.
bat′on, *n.* a small wooden club carried by policemen: a light stick used by a band conductor.
battalion, bat-al′yun, *n.* a part of a regiment of foot-soldiers.
bat′ten, *v.* to grow fat.
bat′ten, *n.* a piece of board: in ships, a strip of wood used to fasten down the hatches.
bat′ter, *v.* to beat heavily.—*n.* a beaten-up mixture (such as flour and water) for cooking.—*n.* **bat′tering-ram,** in olden times, a war weapon for battering down walls; it consisted of a large beam with an iron head like that of a ram.
bat′tery, *n.* a number of cannon: a number of connected cells for storing electricity.
battle, bat′l, *n.* a fight, esp. between armies.—Also *v.*—*ns.* **battle-axe; battle-cry; battlefield; battleship.**
battledore, bat′l-dōr, *n.* a light bat for striking a ball or shuttlecock.
battlement, bat′l-ment, *n.* a wall on the top of a building, with openings or notches for firing from.
bauble, baw′bl, *n.* a child's plaything: a jester's stick, having a head and ass's ears on the end.
bawl, *v.* to shout or cry out loudly.—Also *n.*
bay, *adj.* reddish-brown.—*n.* a bay-coloured horse.
bay, *n.* an opening of the sea: an inward bend of the shore.
bay, *n.* the laurel-tree: a wreath of bay given as a prize.
bay, *n.* the sound of barking: the deep cry of hunting dogs.—Also *v.*—**to hold (or keep) at bay,** to keep an enemy at his distance; **to stand (or be) at bay,** to turn and face an enemy near at hand.
bay′onet, *n.* a steel dagger that can be fixed to the muzzle of a rifle.—*v.* to stab with a bayonet.
bay′-win′dow, *n.* a window which juts out.
bazaar′, bazar′, *n.* in the East, a street of shops or a market-place: a shop: a sale of work.
beach, *n.* the shore of the sea or of a lake, esp. when sandy or pebbly.—*v.* to haul a boat up on the beach.
bea′con, *n.* a fire on a hill used as a sign of danger: anything that warns of danger (e.g. a light or other sign to mark rocks, street crossings, etc.).

bead, *n.* a small ball of glass, amber, etc. strung along with others to form a necklace.

beadle, bēd'l, *n.* a servant in a church, college, etc.: in Scotland, the church-officer.

beagle, bē'gl, *n.* a small hound used in hunting hares.

beak, *n.* the bill of a bird.

beak'er, *n.* a large drinking-bowl or cup: a chemist's measuring-glass.

beam, *n.* a large and straight piece of timber or iron: a ray of light: the greatest breadth of a ship.

bean, *n.* the name of several kinds of pod-bearing plants and their seeds.

bear, bār, *v.* to carry: to endure: to bring forth.—*adj.* **bear'able**, able to be borne or endured.—*ns.* **bear'er**, a carrier or messenger; **bear'ing**, behaviour: direction.

bear, bār, *n.* a heavy four-footed animal with long shaggy hair and hooked claws.—*ns.* **bear'-bait'ing**. See **bait**; **bear'skin**, the high fur cap worn by the Guards in the British Army.

beard, bērd, *n.* the hair that grows on the chin and cheeks.—*v.* to take by the beard: to face up to.

beast, *n.* a four-footed animal: a brutal person.—*adj.* **beast'ly**, like a beast in actions or behaviour: coarse.—*n.* **beast'liness**.

beat, *v.* to strike again and again: to overcome or defeat: to throb: to rouse birds by hitting the bushes, heather, etc. with sticks.—*n.* a stroke: a round or course (e.g. a policeman's *beat*).—*adj.* **beat'en**, made smooth or hard by beating: worn by use: defeated.

beatify, bē-at'i-fī, *v.* to make blessed or happy.—*adj.* **beatif'ic**, very happy.

Beatitudes, bē-at'i-tūdz, *n.pl.* the sayings of Christ (Matt. v.) as to who are the happiest people.

beau, bō, *n.* a man who pays great attention to dress: a dandy.

beauty, bū'ti, *n.* pleasing appearance (e.g. of a person or thing), or pleasing sound (e.g. of music, poetry, voices, etc.): anything graceful or very good: a fine-looking woman.—*adjs.* **beau'tiful**, **beau'teous**.—*v.* **beau'tify**, to make beautiful.

beav'er, *n.* a large gnawing animal, which lives both on land and in water: a hat or glove made of beaver fur.

becalm, be-kahm', *v.* to make calm, still, or quiet.—*adj.* **becalmed**, (of a sailing-ship) unable to move for want of wind.

because, bē-kawz', *conj.* by reason of *the fact that*.

beck'on, *v.* to make a sign to.—**at a person's beck and call**, always willing to act the slave to a person.

become, be-kum', *v.* to pass from one state to another: to come to be: to suit.—*adj.* **becom'ing**, suitable: graceful.

bed, *n.* a place on which to rest or sleep: a plot in a garden: the bottom of a river.—*ns.* **bed'ding**, mattress, bed-clothes, etc.: straw, etc. for cattle to lie on; **bed'-rock**, the solid rock farthest from the surface of the ground; **bed'room**, a room for sleeping; **bed'stead**, a frame for supporting a bed.—*adj.* **bed'ridden**, kept in bed by sickness or illness.

bedaub', *v.* to smear (with paint, etc.).

bedeck', *v.* to adorn.

bediz'en, *v.* to dress in gay colours.

bed'lam, *n.* an asylum for mad persons: a noisy place.

Bedouin, bed'oo-in, *n.* a desert Arab who leads a roaming life.

bedraggle, be-drag'l, *v.* to soil by dragging in the wet or dirt.—*adj.* **bedrag'gled**, untidy.

bee, *n.* a four-winged insect that makes honey.—*ns.* **bee'hive**, a case or box in which bees are kept; **bee'-line**, the shortest road from one place to another; **bees'-wax**, the wax made by bees, and used by them in forming their cells.

beech, *n.* a common forest tree whose wood is hard and useful.

beef, *n.* the flesh of an ox or cow:—*pl.* **beeves**, oxen.—*ns.* **beef'-eat'ers**, certain men, wearing old-time dress, who act as guards for the Queen and the Tower of London; **beef'steak** (-stāk), a thick slice beef for cooking; **beef'tea**, for the sick and ill, ma the strained juice of bee **beefy**, fleshy: stout and

betray′, *v.* to give up (e.g. secrets, one's friends, etc.) to an enemy shamefully: to show.—*n.* **betray′al.**

betrōth, *v.* to promise in marriage.—*n.* **betrōthal**, promise of marriage.

bet′ter, *adj.* good in a higher degree.—*v.* to improve.—**to get the better of**, to defeat, to overcome.

between′, *prep.* and *adv.*, in the middle of two persons, places, or times.—Also **betwixt′.**

bev′el, *n.* a slanting edge (e.g. of a toothed wheel, mirror, etc.).

beverage, bev′er-āj, *n.* a drink, esp a pleasant or strengthening one.

bev′y, *n.* a flock, esp. of birds.

bewail′, *v.* to mourn loudly over.

beware′, *v.* to be on one's guard: to be watchful for danger.

bewil′der, *v.* to puzzle: to confuse.—*n.* **bewil′derment**, confusion.

bewitch′, *v.* to put under a spell: to charm.—*adj.* **bewitch′ing**, charming: very beautiful.

beyond′, *prep.* farther than: too far gone for (e.g. broken *beyond* repair, lost *beyond* recall).—Also *adv.*

bī′as, *n.* a weight on one side of a bowl (in the game of bowls), making it lean or turn to one side: a leaning to one side (esp. in a person's opinions).—*v.* to make to lean to one side.

Bible, bī′bl, *n.* the holy book of the Christian Church.—*adj.* **Bib′lical.**

bibliography, bib-li-og′raf-i, *n.* the knowledge of books, their authors, subjects, etc.: a list of books about a subject.—*n.* **bibliog′rapher.**

bibliophile, bib′li-ō-fīl, *n.* a lover of books, esp. of rare books.

bibulous, bib′ū-lus, *adj.* fond of drinking: thirsty.

bīcentē′nary, *n.* the two hundredth year after an event.

biceps, bī′seps, *n.* the muscle in front of the upper part of the arm.

bick′er, *v.* to quarrel over small matters: to move quickly, as running water.—Also *n.*

bicycle, bī′si-kl, *n.* a cycle with two wheels.

bid, *v.* to offer: to invite: to command: to offer to pay at a sale.—*n.* an offer of a price: a bold try.

biennial, bī-en′yal, *adj.* lasting two years: happening once in two years.—*n.* a plant that flowers only in its second year, then dies.

bier, bēr, *n.* a carriage or frame of wood for carrying a dead body.

big′amy, *n.* the crime of having two wives or two husbands at once.—*n.* **big′amist.**—*adj.* **big′amous.**

bight, bīt, *n.* a small bay.

big′ot, *n.* one who too strongly believes or supports anything (e.g. an opinion about religion).—*n.* **big′otry.**

bil′berry, *n.* a plant with a dark-blue berry, called also *whortleberry* and, in Scotland, *blaeberry.*

bile, *n.* a fluid coming from the liver: bad humour.—*adj.* **bil′ious**, ill with bile: sick: greenish-yellow in colour.—*n.* **bil′iousness.**

bilge, bilj, *n.* the bulging part of a cask: the broadest part of a ship's bottom.—*n.* **bilge-water** or **bilge**, water which lies in the ship's bottom: anything evil-smelling.

bilingual, bī-ling′gwal, *adj.* speaking two languages.

bilk, *v.* to dodge: to cheat.

bill, *n.* a battle-axe: a hatchet with a long blade: the beak of a bird: an account for money: a law before it has been talked over and declared: a printed sheet or advertisement.

bil′let, *n.* a short note or letter: a small log for the fire: a lodging, esp. for soldiers.—*v.* to lodge (soldiers) in private houses.

billiards, bil′yardz, *n.* a game played with a stick (*cue*) and balls on a table which has six pockets.

billion, bil′yun, *n.* in Britain, a million millions (1,000,000,000,000); in U.S.A. and France, a thousand millions (1,000,000,000).

billow, bil′ō, *n.* a great wave.—*adj.* **bill′owy.**

bin, *n.* a place for storing corn, wine, etc., or for holding dust and ashes.

bind, bīnd, *v.* to tie with a band: to fasten together: to make to promise: to hold firmly.—*n.* **bīnd′ing**, the act of binding: anything that binds: the covering of a book.

bing, *n.* a heap or pile.

binnacle, bin′a-kl, *n.* (on ships) the box in which the compass is kept.

binoculars, bin-ok′ū-lars, *n.pl.* a telescope having two eye-pieces.

biography, bī-og′raf-i, *n.* a written account of the life of a person.—*n.* **biog′rapher**, one who writes biography.—*adj.* **biograph′ical.**

biology, bī-ol′oj-i, *n.* the science that deals with living things.—*adj.* **biolog′ical.**—*n.* **biol′ogist.**

bī′ped, *n.* an animal with two feet.

birch, *n.* a hard-wood tree: a switch of birch twigs, used for flogging.—*v.* to flog.

bird, *n.* a feathered, egg-laying creature.—**bird of prey.** See **prey**; **bird's-eye view**, a wide view, as would be seen from above.

birth′day, *n.* the day on which one is born: the day of the same date each year.—*n.* **birth′right**, the right which one may claim because of one's birth.

biscuit, bis′kit, *n.* bread baked hard in small cakes, and usually sweetened or flavoured.—*adj.* pale brown in colour.

bīsect′, *v.* to cut in two equal parts.

bish′op, *n.* a clergyman of high rank (next to an archbishop) in the Church of England and Roman Catholic Church.—*n.* **bish′opric**, the district ruled by a bishop.

bison, bī′son, *n.* a large wild animal like a bull: an American buffalo.

bit, *n.* a small piece: a small tool for boring: the part of the bridle which the horse holds in its mouth.

bite, *v.* to seize or tear with the teeth.—*n.* a grasp by the teeth: the amount torn away: (in fishing) a nibble at the bait.

bit′ter, *adj.* sharp, esp. to the taste: unpleasant: painful.

bit′tern, *n.* a bird like a heron.

bivouac, biv′oo-ak, *n.* a rest for the night in the open air.—*v.* to pass the night in the open air.

bi-weekly, *adj.* happening twice a week or once every two weeks.

bizarre, bi-zar′, *adj.* odd: strange.

blab, *v.* to talk much: to let out a secret.

black, *adj.*—*ns.* **black′amoor**, a black man, negro; **black′berry**, the berry of the bramble; **black′cock**, a kind of grouse; **blackguard** (blag′ard), a wicked person, rogue, sneak; **black′lead**, a black mineral (not lead) used in making pencils, etc.; **black′leg**, one who works when his comrades are on strike; **blackmailer**, a person who says he will let out a secret unless paid money (called **blackmail**) to keep quiet; **black market**, illegal or dishonest buying and selling; **black-out**, darkness caused by the putting out of all lights; **black′smith**, a man who makes articles of iron.

blad′der, *n.* a thin bag of skin or rubber.

blade, *n.* the leaf of grass or corn: the cutting part of a knife, sword, etc.: the flat part of an oar.

blaeberry, blā′ber-i. See **bilberry.**

blame, *v.* to find fault with.—*n.* fault.—*adjs.* **blam′able**; **blame′less**; **blame′worthy.**

blanc-mange, bla-mawngzh′, *n.* a jelly-pudding made with milk.

bland, *adj.* smooth: gentle: mild.

bland′ish, *v.* to flatter and coax.—*n.* **bland′ishment.**

blank, *adj.* without writing or marks (e.g. *blank* paper): empty.—*n.* an empty space.—*ns.* **blank′-cart′ridge**, a cartridge without a bullet; **blank-verse**, poetry without rhyme.

blank′et, *n.* a woollen bed-covering.

blare, *v.* to sound loudly.—Also *n.*

blar′ney, *n.* flattery or coaxing talk.—*v.* to cheat with such talk.

blaspheme, blas-fēm′, *v.* to speak lightly or wickedly of God: to curse and swear.—*ns.* **blas-phem′er**; **blas′phemy.**—*adj.* **blas′phemous.**

blast, *n.* a blowing or gust of wind: a loud note on a trumpet: an explosion.—*v.* to blow with great force: to break (stones, a bridge, etc.) by explosion: to curse.—*n.* **blast′-fur′nace**, a furnace (e.g. one used in iron-smelting) into which hot air is blown.

blātant, *adj.* noisy: loud: showy.

blaze, *n.* a rush of light or of flame: a mark made on a tree by cutting off a strip of bark.—*v.* to burn with a flame: to throw out light: to mark trees in passing in order to show which way one has gone.—*n.* **blaz′er**, a sports jacket of bright colour.

blazon, blā'zn, *v.* to make known: to show off.—*n.* **blaz'onry**, the art of drawing coats of arms.

bleach', *v.* to whiten.—*ns.* **bleach'-field**, **bleach'ing-green**, a place for bleaching cloth.

bleak, *adj.* dull and cheerless: cold, unsheltered.—*n.* **bleak'ness**.

blear, *adj.* sore or inflamed (e.g. *blear*-eyed).

bleat, *v.* to cry as a sheep.—Also *n.*

bleb, *n.* a blister.

bleed, *v.* to lose blood: to draw blood from.—*n.* **bleed'ing**, a flow of blood.

blem'ish, *n.* a stain: a fault or flaw.—*v.* to stain.

blench, blensh, *v.* to start back.

blend, *v.* to mix together.—Also *n.*

bless, *v.* to make happy: to wish happiness to: to praise.—*adj.* **bless'ed**, happy: prosperous.—*n.* **bless'ing**, a wish or prayer for happiness or success: any means or cause of happiness.

blight, blīt, *n.* a disease in plants which withers them: anything that destroys.—*v.* to destroy.

blind, *adj.* without sight: unable to look ahead.—*n.* a window-screen: a shade: something which leads astray.—*v.* to make blind: to dazzle.—*n.* **blind'ness**.—*adj.* **blind'fold**, having the eyes bandaged, so as not to see.—*n.* **blind'-alley**, a street open only at one end: a job that leads nowhere.

blink, *v.* to wink: to see with the eyes half-closed: to shine unsteadily.—*n.* a glimpse, glance, or wink: a gleam of light.—*n.pl.* **blink'ers**, pieces of leather over a horse's eyes to prevent it seeing in any direction except in front.

bliss, *n.* very great happiness: heaven.—*adj.* **bliss'ful**.

blis'ter, *n.* a thin bubble on the skin full of watery matter.—*v.* to raise a blister.

blithe, blīth, *adj.* happy: gay: lively.—*adj.* **blithe'some**, joyous.

bliz'zard, *n.* a blinding storm of wind and snow.

bloat, *v.* to swell or puff out.—*adj.* **bloat'ed**, puffed and swollen in appearance.

bloat'er, *n.* a smoked herring.

blob, *n.* a drop of liquid.

block, *n.* a lump of wood, stone, etc.: the wood on which persons are beheaded: a group of houses: large pulley.—*v.* to bar the way.—*n.* **block'head**, a stupid fellow.

blockade, blok-ād', *v.* to surround a fort or country so that food and supplies cannot reach it.—Also *n.*

blonde, *n.* a woman of fair skin and light-coloured hair.

blood, blud, *n.* the red liquid in the veins of men and animals: one's descent or parentage (e.g. He is of royal *blood*).—*adjs.* **blood'y**; **blood'less**; **blood'-thirsty**, cruel, eager to kill; **blood'-shot**, marked with blood.—*ns.* **blood'-horse**, a pure-bred horse; **blood'-hound**, a large dog, with a keen scent, used for tracking; **blood'shed**, the spilling of blood: slaughter; **blood'-vessel**, a vein (of the body) in which the blood travels.

bloom, *v.* to put forth blossoms: to flower.—*n.* a blossom or flower: rosy colour.

blos'som, *n.* a flower-bud: the flowers on a fruit-tree.—*v.* to put forth blossoms or flowers.

blot, *n.* a spot or stain.—*v.* to spot or stain: to dry writing with blotting-paper.

blotch, *n.* a dark spot on the skin.—*v.* to mark with blotches.—*adjs.* **blotched**, **blotch'y**.

blouse, blowz, *n.* a loose outer garment, tucked in at the waist.

blow, blō, *n.* a stroke or knock: a sudden piece of bad luck.

blow, blō, *v.* to bloom or blossom.

blow, blō, *v.* (of air or wind) to move: to drive air upon or into: to breathe hard or with difficulty: to boast.—*adj.* **blow'y**, windy.—to **blow up**, to destroy by explosion.

blub'ber, *n.* the fat of whales and other sea animals.—*v.* to weep.

bludgeon, bluj'n, *n.* a short stick with a heavy end.

blue, bloo, *n.* the colour of the sky when clear: a person who is one of the best players of a game at a university.—*ns.* **blue'bell**, the wild hyacinth: the harebell; **blue'-bottle**, a large fly often seen in houses; **blue'-jacket**, a sailor in the navy; **blue'-pē'ter**, a blue

flag with white centre, hoisted when a ship is about to sail; **blue′-print**, a sketch plan of work to be done; **blue′-stocking**, a learned lady.

bluff, *adj.* rough and jolly in manners: outspoken: steep.—*n.* a high steep bank overlooking the sea or a river: boasting.—*v.* to deceive.

blun′der, *v.* to make a bad mistake. —Also *n.*

blun′derbuss, *n.* a short hand-gun with a wide mouth.

blunt, *adj.* having an edge or point that is not sharp: rough in manner.—*v.* to dull the edge or point: to weaken.

blur, *n.* a blot, stain, or spot.—Also *v.*

blurt, *v.* to speak without thinking.

blush, *n.* a red glow on the face caused by shame, etc.: any reddish colour.—*v.* to show shame or confusion by growing red in the face: to grow red.

blus′ter, *v.* to make a noise like a blast of wind: to boast: to bully. —*n.* a blast or roaring as of the wind: boasting language.

boa, bō′a, *n.* a certain kind of serpent (such as the **boa-constric′tor**), which kills its prey by winding itself round it and crushing it: a long scarf of fur or feathers.

boar, bōr, *n.* the male pig.

board, bōrd, *n.* a broad and thin strip of timber: a table to put food on: food: the persons who are appointed to look after a business, public service, etc. (e.g. *Board* of Trade, Education): the deck of a ship: stiff paper used in the binding of books.—*v.* to cover with boards: to supply with food at fixed terms: to enter a ship: to attack.—*ns.* **board′er**, one who receives board (food); **board′ing-house**, a house where boarders are kept; **board′ing-school**, a school in which board (food) is given as well as lessons.

boast, *v.* to brag, to speak proudly, esp. of one's self.—*n.* something said in a bragging or boasting manner: a person who brags or boasts.—*adj.* **boast′ful**, fond of bragging.

boat, *n.* a vessel for sailing, a ship: a boat-shaped dish (e.g. a *sauce-boat*).—*v.* to sail about in a boat.

boatswain, bō′sn, *n.* an officer who looks after a ship's boats, rigging, flags, etc.—often shortened to **bō′sun.**

bob′bin, *n.* a small piece of wood on which thread is wound.

bode, *v.* to foretell: to be a sign of.

bodice, bod′is, *n.* a woman's garment.

bod′kin, *n.* a small dagger: a large blunt needle.

bod′y, *n.* the main part of a man or animal: the main part of anything: a person: a number of persons gathered together.—*adj.* and *adv.* **bod′ily**, having to do with the body (not with the mind).—*n.* **bod′yguard**, a guard to protect a person (such as a king) from attack.

bog, *n.* soft ground: a marsh.

bogey, bōg′i, *n.* a goblin: something greatly feared.

bog′gle, *v.* to be shy at starting something: to jump with fright.—*n.* **bogg′ler**, one who is in doubt: one who makes a bad job of something.

bogie, bogey, bōg′i, *n.* a low truck: an under-carriage, as in a railway engine.

bogle, bōg′l, *n.* a ghost or goblin: a scarecrow.

bō′gus, *adj.* false.

boil, *v.* to bubble up owing to heat: to heat until boiling takes place: to be excited.

boil, *n.* a reddened and swollen sore.

boisterous, bois′ter-us, *adj.* wild: noisy: stormy.

bōld, *adj.* daring, full of courage: cheeky.—*adj.* **bold′-faced**, cheeky.

bole, *n.* the trunk of a tree.

bōl′ster, *n.* a long round pillow or cushion.—*v.* to support.

bōlt, *n.* an iron screw used to fasten a door, etc.: an arrow: a thunderbolt.—*v.* to fasten with a bolt: to swallow hurriedly: to rush away.—*adv.* **bolt′-up′right**, upright and straight as an arrow.

blazon, blā´zn, *v.* to make known: to show off.—*n.* **blaz´onry**, the art of drawing coats of arms.

bleach´, *v.* to whiten.—*ns.* **bleach´-field**, **bleach´ing-green**, a place for bleaching cloth.

bleak, *adj.* dull and cheerless: cold, unsheltered.—*n.* **bleak´ness**.

blear, *adj.* sore or inflamed (e.g. *blear*-eyed).

bleat, *v.* to cry as a sheep.—Also *n.*

bleb, *n.* a blister.

bleed, *v.* to lose blood: to draw blood from.—*n.* **bleed´ing**, a flow of blood.

blem´ish, *n.* a stain: a fault or flaw. —*v.* to stain.

blench, blensh, *v.* to start back.

blend, *v.* to mix together.—Also *n.*

bless, *v.* to make happy: to wish happiness to: to praise.—*adj.* **bless´ed**, happy: prosperous.—*n.* **bless´ing**, a wish or prayer for happiness or success: any means or cause of happiness.

blight, blīt, *n.* a disease in plants which withers them: anything that destroys.—*v.* to destroy.

blīnd, *adj.* without sight: unable to look ahead.—*n.* a window-screen: a shade: something which leads astray.—*v.* to make blind: to dazzle.—*n.* **blind´ness**. —*adj.* **blind´fold**, having the eyes bandaged, so as not to see.—*n.* **blind´-alley**, a street open only at one end: a job that leads nowhere.

blink, *v.* to wink: to see with the eyes half-closed: to shine unsteadily.—*n.* a glimpse, glance, or wink: a gleam of light.—*n.pl.* **blink´ers**, pieces of leather over a horse's eyes to prevent it seeing in any direction except in front.

bliss, *n.* very great happiness: heaven.—*adj.* **bliss´ful**.

blis´ter, *n.* a thin bubble on the skin full of watery matter.—*v.* to raise a blister.

blithe, blīth, *adj.* happy: gay: lively. —*adj.* **blithe´some**, joyous.

bliz´zard, *n.* a blinding storm of wind and snow.

bloat, *v.* to swell or puff out.—*adj.* **bloat´ed**, puffed and swollen in appearance.

bloat´er, *n.* a smoked herring.

blob, *n.* a drop of liquid.

block, *n.* a lump of wood, stone, etc.: the wood on which persons are beheaded: a group of houses: large pulley.—*v.* to bar the way. —*n.* **block´head**, a stupid fellow.

blockade, blok-ād´, *v.* to surround a fort or country so that food and supplies cannot reach it.—Also *n.*

blonde, *n.* a woman of fair skin and light-coloured hair.

blood, blud, *n.* the red liquid in the veins of men and animals: one's descent or parentage (e.g. He is of royal *blood*).—*adjs.* **blood´y**; **blood´less**; **blood´-thirsty**, cruel, eager to kill; **blood´-shot**, marked with blood.—*ns.* **blood´-horse**, a pure-bred horse; **blood´-hound**, a large dog, with a keen scent, used for tracking; **blood´shed**, the spilling of blood: slaughter; **blood´-vessel**, a vein (of the body) in which the blood travels.

bloom, *v.* to put forth blossoms: to flower.—*n.* a blossom or flower: rosy colour.

blos´som, *n.* a flower-bud: the flowers on a fruit-tree.—*v.* to put forth blossoms or flowers.

blot, *n.* a spot or stain.—*v.* to spot or stain: to dry writing with blotting-paper.

blotch, *n.* a dark spot on the skin.—*v.* to mark with blotches.—*adjs.* **blotched**, **blotch´y**.

blouse, blowz, *n.* a loose outer garment, tucked in at the waist.

blow, blō, *n.* a stroke or knock: a sudden piece of bad luck.

blow, blō, *v.* to bloom or blossom.

blow, blō, *v.* (of air or wind) to move: to drive air upon or into: to breathe hard or with difficulty: to boast.—*adj.* **blow´y**, windy.—**to blow up**, to destroy by explosion.

blub´ber, *n.* the fat of whales and other sea animals.—*v.* to weep.

bludgeon, bluj´n, *n.* a short stick with a heavy end.

blue, bloo, *n.* the colour of the sky when clear: a person who is one of the best players of a game at a university.—*ns.* **blue´bell**, the wild hyacinth: the harebell; **blue´-bottle**, a large fly often seen in houses; **blue´-jacket**, a sailor in the navy; **blue´-pē´ter**, a blue

flag with white centre, hoisted when a ship is about to sail; **blue′-print**, a sketch plan of work to be done; **blue′-stocking**, a learned lady.

bluff, *adj.* rough and jolly in manners: outspoken: steep.—*n.* a high steep bank overlooking the sea or a river: boasting.—*v.* to deceive.

blun′der, *v.* to make a bad mistake. —Also *n.*

blun′derbuss, *n.* a short hand-gun with a wide mouth.

blunt, *adj.* having an edge or point that is not sharp: rough in manner.—*v.* to dull the edge or point: to weaken.

blur, *n.* a blot, stain, or spot.—Also *v.*

blurt, *v.* to speak without thinking.

blush, *n.* a red glow on the face caused by shame, etc.: any reddish colour.—*v.* to show shame or confusion by growing red in the face: to grow red.

blus′ter, *v.* to make a noise like a blast of wind: to boast: to bully. —*n.* a blast or roaring as of the wind: boasting language.

boa, bō′a, *n.* a certain kind of serpent (such as the **boa-constric′tor**), which kills its prey by winding itself round it and crushing it: a long scarf of fur or feathers.

boar, bōr, *n.* the male pig.

board, bōrd, *n.* a broad and thin strip of timber: a table to put food on: food: the persons who are appointed to look after a business, public service, etc. (e.g. *Board* of Trade, Education): the deck of a ship: stiff paper used in the binding of books.—*v.* to cover with boards: to supply with food at fixed terms: to enter a ship: to attack.—*ns.* **board′er**, one who receives board (food); **board′ing-house**, a house where boarders are kept; **board′ing-school**, a school in which board (food) is given as well as lessons.

boast, *v.* to brag, to speak proudly, esp. of one's self.—*n.* something said in a bragging or boasting manner: a person who brags or boasts.—*adj.* **boast′ful**, fond of bragging.

boat, *n.* a vessel for sailing, a ship: a boat-shaped dish (e.g. a *sauce-boat*).—*v.* to sail about in a boat.

boatswain, bō′sn, *n.* an officer who looks after a ship's boats, rigging, flags, etc.—often shortened to **bō′sun.**

bob′bin, *n.* a small piece of wood on which thread is wound.

bode, *v.* to foretell: to be a sign of.

bodice, bod′is, *n.* a woman's garment.

bod′kin, *n.* a small dagger: a large blunt needle.

bod′y, *n.* the main part of a man or animal: the main part of anything: a person: a number of persons gathered together.—*adj.* and *adv.* **bod′ily**, having to do with the body (not with the mind).—*n.* **bod′yguard**, a guard to protect a person (such as a king) from attack.

bog, *n.* soft ground: a marsh.

bogey, bōg′i, *n.* a goblin: something greatly feared.

bog′gle, *v.* to be shy at starting something: to jump with fright.—*n.* **bogg′ler**, one who is in doubt: one who makes a bad job of something.

bogie, bogey, bōg′i, *n.* a low truck: an under-carriage, as in a railway engine.

bogle, bōg′l, *n.* a ghost or goblin: a scarecrow.

bō′gus, *adj.* false.

boil, *v.* to bubble up owing to heat: to heat until boiling takes place: to be excited.

boil, *n.* a reddened and swollen sore.

boisterous, bois′ter-us, *adj.* wild: noisy: stormy.

bōld, *adj.* daring, full of courage: cheeky.—*adj.* **bold′-faced**, cheeky.

bole, *n.* the trunk of a tree.

bōl′ster, *n.* a long round pillow or cushion.—*v.* to support.

bōlt, *n.* an iron screw used to fasten a door, etc.: an arrow: a thunderbolt.—*v.* to fasten with a bolt: to swallow hurriedly: to rush away.—*adv.* **bolt′-up′right**, upright and straight as an arrow.

bomb, bom, *n.* a case containing material that explodes or causes fires or does other damage.—*v.* **bombard′,** to attack with shells or bombs.—*ns.* **bombardier,** -dēr′, the bomb-aimer in a bombing-aeroplane: an artillery-man next in rank above a gunner; **bombard′ment; bomb′er,** an aeroplane fitted for dropping bombs; **bomb′-shell,** a bomb: a startling piece of news.

bom′bast, *n.* high-sounding language.—*adj.* **bombas′tic,** high-sounding but not meaning much.

bonbon, bong′bong, *n.* a sweet.

bond, *n.* that which binds: a written promise to pay or do something: a building or warehouse where spirits, tobacco, etc. are kept until the taxes are paid for them.—*v.* to put into such a warehouse.—*ns.* **bond′maid, bond′man,** a servant; **bond′age,** slavery.

bone, *n.* a hard material forming the skeleton of animals.—*v.* to take the bones out of meat.—*adj.* **bon′y,** full of bones: made of bone.—*n.* **bone′-set′ter,** one who puts together broken legs, arms, etc., so that they may heal.

bon′fire, *n.* a large fire in the open air.

bon′net, *n.* a woman's hat of the old-style: a soft cap: the covering over a motor-car engine.

bon′ny, *adj.* good-looking.

bonspiel, bon′spēl, *n.* curling match.

bō′nus, *n.* an extra payment (e.g. of wages) given as a gift.

boo′by, *n.* a silly or stupid fellow.—**booby prize,** a prize for the person who is last in a competition; **booby trap,** something placed above a door, so that it falls when a person enters.

book, *n.* printed pages bound together for reading: the Bible.—*v.* to order beforehand (e.g. *Book* two seats for the circus next Monday).—*n.* **book′worm,** a person who reads many books.

boom, *n.* a pole by which a sail is stretched: a barrier across a harbour or river-mouth.

boom, *v.* to make a hollow sound or roar: to become rich or successful all of a sudden: to push something into people's notice.—*n.* a loud, hollow sound: a rush or increase of trade.

boom′erang, *n.* a curved wooden stick used by natives of Australia in hunting game (if missing the mark when thrown, it returns to the thrower).

boon, *n.* something very much asked for: a gift: favour.

boon, *adj.* gay, merry: kind.

boor, *n.* a countryman, a peasant: a coarse or awkward person.—*adj.* **boor′ish.**

boot, *n.* a covering for the foot and lower part of the leg, generally made of leather: an instrument of torture, in which the legs were forced into a strong case and crushed.—*v.* to kick.—*ns.* **boot′-jack,** an instrument for taking off boots; **boots,** a servant at a hotel who cleans the boots, runs errands, etc.

boot, *v.* to bring profit to: to be of use to.—*adj.* **boot′less,** without profit: useless.

booth, *n.* a hut: a covered stall at a fair or market.

boot′y, *n.* plunder taken in war or by force.

bor′der, *n.* the edge or margin of anything: the boundary of a country, esp. that between England and Scotland: a flower-bed in a garden.—*v.* to be near to: to put an edging round.

bore, *v.* to make a hole by piercing: to weary or annoy.—*n.* a hole made by boring: the size across the tube of a gun: a person or thing that wearies.—*n.* **bore′-dom,** weariness.

bore, *n.* a flood or wave which at high tide rushes with great force up the mouths of certain rivers.

boreas, bō′re-as, *n.* the north wind.

borough, bur′ō, *n.* a town which has a mayor and town council: a town which sends a member or members to the House of Commons (*parliamentary borough*).

borrow, bor′ō, *v.* to get from another on loan.—*adj.* **borr′owed,** taken on loan: pretended, false.

bor′zoi, *n.* a dog like the greyhound but with a long-haired coat.

bosh, *n.* nonsense: foolish talk.
bosom, booz′um, *n.* the breast.—*adj.* close (e.g. a *bosom* friend).
boss, *n.* a knob or stud.
boss, *n.* a leader or master.—*v.* to manage, order about.
bosun. See **boatswain.**
bot′any, *n.* the branch of knowledge connected with plants.—*adjs.* **botan′ic, botan′ical.**—*n.* **bot′anist,** one who studies botany.—**botanic garden,** a large public garden where plants and trees of different countries are grown for show.
botch, *n.* work badly done.—*v.* to mend clumsily: to do badly.
both′er, *v.* to be a nuisance to: to trouble.—*n.* **bother,** trouble.
both′y, both′ie, *n.* a hut: a sleeping-place for navvies, workers, etc.
bottle, bot′l, *n.* a hollow vessel (with a narrow opening) for holding liquids.—*v.* to put in a bottle: to shut up in a narrow space.
bot′tom, *n.* the lowest part of anything.—*adj.* **bott′omless.**
boudoir, bood′war, *n.* a lady's private room.
bough, bow, *n.* a branch of a tree.
boulder, bōld′er, *n.* a large stone, esp. one made round by water.
boulevard, bool′e-var, *n.* a broad walk or avenue, bordered with trees.
bounce, bowns, *v.* to jump or spring suddenly: to boast.—Also *n.*—*adj.* **bounc′ing,** large and heavy: strong.
bound, bownd, *n.* an edge or border (often used in *pl.*).—*v.* to mark a limit (e.g. The sea *bounds* Britain).—*adj.* **bound′less.**—*n.* **bound′ary,** something marking the edge or border (e.g. of a playing-field).
bound, bownd, *v.* to spring or leap.—Also *n.*
bound, bownd, *adj.* ready to go, going (e.g. He is *bound* for London): forced to: sure to.
bounty, bown′ti, *n.* a gift: kindness: money given as a help.—*adjs.* **boun′teous, boun′tiful,** giving plentifully.
bouquet, book′ā, *n.* a bunch of flowers.
bourgeois, boorzh′wa, *n.* a citizen: one of the middle class: a merchant or shopkeeper.—*n.* **bourgeoisie** (boorzh′waw-zē), the middle class of citizens.
bout, bowt, *n.* a fight or trial of strength (e.g. boxing, fencing, illness, etc.).
bovine, bō′vīn, *adj.* having to do with cattle: like cattle: stupid.
bow, *v.* to bend in greeting a person: to give in: to crush.—*n.* a bending of the head or body as a sign of respect or welcome.
bow, bō, *n.* a weapon for shooting arrows, made of a stick of springy wood bent by a string: looped knot: the stick by which the strings of a violin are played.—*adj.* **bow′-legged,** having legs bent like a bow.—*ns.* **bow′shot,** the distance to which an arrow can be shot from a bow; **bow-window,** a window built in a curve.
bow, *n.* the front part of a ship (often used in *pl.*).
bow′els, *n.pl.* the inmost parts of the body.
bow′er, *n.* a shady spot in a garden: an inner room.
bowl, bōl, *n.* a basin for kitchen use.
bowls, bōls, *n.pl.* a game played on a green, heavy balls (*bowls*) being rolled towards a smaller white ball, called a *jack.*—*v.* **to bowl,** to play at bowls: to move speedily like a bowl: (in cricket) to send the ball at the wicket: to put out a batsman by knocking his wicket with the ball.—*n.* **bowl′er,** one who bowls: a black hat with a rounded top.—**to bowl over,** to knock down.
bowsprit, bō′sprit, *n.* a strong spar jutting out over the bows of a sailing-ship.
box, *n.* a hard-wood tree: a case for holding anything: in a theatre, private closed-in seats: the driver's seat on a carriage.—*n.* **Box′ing-day,** the day after Christmas Day.—**to box the compass,** to name the 32 points of the compass in order.
box, *v.* to strike with the hand or fist.—*n.* **box′ing,** a sport consisting of fighting with the fists, padded gloves being worn.
boy, *n.* a male child: a native servant.

boy'cott, *v.* to refuse to deal with (e.g. a merchant), usually in revenge for unfriendly act.—Also *n.*

brace, *n.* anything that draws together and holds tightly: a pair or couple: a carpenter's tool used in boring: (*pl.*) straps for holding up the trousers: ropes for the masts of a ship.—*v.* to tighten or strengthen, to give firmness to.—*adj.* **brac'ing,** giving strength.

bracelet, brās'let, *n.* an ornament for the wrist.

brack'en, *n.* a coarse kind of fern.

brack'et, *n.* a support for something fastened to a wall: (*pl.*) marks used in printing—( ), [ ].

brack'ish, *adj.* (of water) rather salt.

brad, *n.* a small nail.—*n.* **brad'awl,** a tool to pierce holes.

brae, brā, *n.* (in Scotland) a hill-slope.

brag, *v.* to boast.—*adj.* **brag'gart,** boastful.—*n.* a vain boaster.

braggadocio, brag-a-dō'shi-o, *n.* one who boasts much: empty boasting.

Brah'man, Brah'min, *n.* among the Hindus of India, a member of the highest or priestly class.

braid, *v.* to plait or twine together.—*n.* cord made by plaiting.

braille, brāl, *n.* raised marks on paper which blind people can read by feeling.

brain, *n.* the part of the body inside the skull, the centre of feeling and thinking.—*v.* to dash out the brains.—*adjs.* **brainy,** clever; **brain'less,** without brains: silly.

braise, brāz, *v.* to stew meat in a pan.

brake, *n.* a fern: a place overgrown with ferns.

brake, *n.* a part of a bicycle, motor-car, train, etc., used for slowing down the speed.

bram'ble, *n.* the blackberry bush and its fruit.

bran, *n.* the outer skin of grain.

branch, bransh, *n.* a shoot or arm-like limb of a tree: a small shop, bank, library, etc. belonging to a bigger one.—*v.* to divide into branches: to spread out like a branch.

brand, *n.* a burning piece of wood: a mark burned into anything with a hot iron: a make of goods having a special brand or mark: a sword: a mark of disgrace.—*v.* to burn or mark with a hot iron: to fix a mark of disgrace upon.—*adj.* **brand'-new,** quite new.

brand'ish, *v.* to wave.

brand'y, *n.* a strong drink.

brass, *n.* metal made by mixing copper and zinc.

brat, *n.* a scornful name for a child.

brava'do, *n.* a show of bravery: a boastful threat.

brave, *adj.* daring: noble: finely dressed: handsome.—*v.* to meet boldly: to defy.—*n.* a Red Indian warrior.—*n.* **brāv'ery.**

Brav'o! Well done! Excellent!

brawl, *n.* a noisy quarrel.—Also *v.*

brawn, *n.* muscle: strength: a mixture of meat made from pig's head and ox-feet.—*adj.* **brawn'y,** big and strong.

bray, *n.* a cry like that of the ass: the sound of a trumpet.—Also *v.*

braze, *v.* to patch with melted brass.—*adj.* **brā'zen** of or like brass: impudent.—*v.* **brā'zen,** to behave cheekily.—*ns.* **brā'zen-face,** one having an impudent face; **brā'zier, brā'sier,** a pan for holding burning coals: one who works in brass.

breach, *n.* a break or opening (e.g. in the walls of a fort): a breaking of a law, of a promise, etc.: a quarrel.—*v.* to make a break or opening in a wall.

bread, bred, *n.* food made of flour or meal baked: food: means of living.—*n.* **bread'-winner,** one who earns a living for a family.

breadth, bredth, *n.* distance from side to side: width.

break, brāk, *v.* to dash in pieces: to tame (a horse).—*ns.* **break'age,** the act of breaking: the thing broken; **break'-down,** an illness, such as that caused by working too hard: the stopping of a machine or motor, etc. (e.g. owing to engine trouble); **break'er,** a wave broken on rocks or the shore; **break'water,** a barrier or bank (of stones and cement) to break the force of the waves.—**break'neck**

speed, great and reckless speed which is likely to end up with a broken neck.

breakfast, brek'fast, *n.* the first meal of the day.—Also *v.*

bream, *n.* a small fish.

breast, brest, *n.* the front part of one's chest.—*v.* to struggle against.—*ns.* **breast'plate**, a plate or piece of armour for the breast; **breast'-work**, a hastily built rampart for defence.

breath, breth, *n.* the air drawn into and then sent out from the lungs: a very slight breeze.—*adj.* **breath'-less**, out of breath.

breathe, brēth, *v.* to draw in and send out air from the lungs.

breech, *n.* the back part of a gun:—*pl.* **breeches** (brich'ez), trousers (esp. those coming just below the knee and fastening there).—*n.* **breech'load'er**, a gun loaded at the breech instead of at the mouth.

breed, *v.* to bring forth: to train or bring up: to cause (e.g. Dirt *breeds* disease).—*n.* that which is bred: kind (e.g. a *breed* of dogs).—*n.* **breed'ing**, act of producing: good manners.

breeze, *n.* a wind: a quarrel.—*adj.* **breez'y**, fanned by breezes: bright, lively.

brer, *n.* brother.

breth'ren, *n.pl.* brothers.

breve, brēv, *n.* the longest note used in music, ‖○‖.

breviary, brēv'i-ar-i, *n.* book containing the daily service of the Roman Catholic Church.

brev'ity, *n.* shortness.

brew, broo, *v.* to make beer: to make tea: to be gathering (e.g. Trouble is *brewing*).—*n.* **brew'ery**, a place for making beer.

briar, **brier**, brī'er, *n.* the wild rose: a heather-plant whose wood is used in the making of tobacco-pipes.

bribe, *n.* a gift (usually money) given secretly and dishonestly to persuade a person to do something.—*v.* to win over with a bribe.—*n.* **brib'ery**.

bric-à-brac, brik'a-brak, *n.* small odds and ends (often articles of value).

brick, *n.* an oblong piece of burned clay.

brī'dal, *n.* a marriage feast: a wedding.—*adj.* having to do with a bride or with a wedding.

bride, *n.* a woman about to be married, or newly married.—*ns.* **bride'groom**, a man about to be married, or newly married; **bride's'-maid**, an unmarried woman who attends the bride at a wedding.

bridge, brij, *n.* a track or road built across a river, etc.: the captain's platform on a ship: a thin piece of wood holding up the strings of a violin: a card-game.—*v.* to build a bridge over: to get over (a difficulty).—*n.* **bridge'-head**, a fortification at the end of a bridge.

bridle, brī'dl, *n.* the straps and bit on a horse's head, by which it is guided.—*v.* to put on a bridle: to hold back.—*n.* **brī'dle-path**, **-road**, a path or way for horsemen.

brief, brēf, *n.* a short statement of any kind (esp. that of a lawyer about a law case).—*adj.* short, said in few words.—**in brief**, in few words.

brier, brī'er, *n.* See **briar**.

brig, *n.* a sailing vessel with two masts and square-cut sails.

brigade', *n.* a body of soldiers.—*ns.* **brigadier'**, **brigadier'-gen'eral**, an officer who commands a brigade.

brig'and, *n.* a robber.—*n.* **brig'andage**, plundering: robbery.

brigantine, brig'an-tēn, *n.* a two-masted ship like a brig.

bright, brīt, *adj.* shining: full of light: clever.—*v.* **bright'en**, to make or grow bright.

brilliant, bril'yant, *adj.* sparkling: very clever.—*n.* a fine diamond.—*ns.* **brill'iancy**, **brill'iance**.

brim, *n.* the rim (e.g. of a cup).—*v.* to be full.—*adj.* **brim'ful**.

brim'stone, *n.* sulphur.

brindled, brin'dld, *adj.* grey or brown and marked with streaks.

brine, *n.* salt water.—*n.* the **brin'y**, the sea.

bring, *v.* to fetch: to carry.—**to bring about**, to cause; **to bring to**, to revive; **to bring up**, to rear: to feed and educate.

brink, *n.* the edge (e.g. of a cliff).

briquette, bri-ket′, *n.* a brick-shaped block of coal made from coal-dust.
brisk, *adj.* full of life: going at a quick pace.—*n.* **brisk′ness.**
bristle, bris′l, *n.* a short, stiff hair (e.g. of a pig).—*v.* to stand on end, as bristles.—*adj.* **brist′ly,** having bristles: rough.
bristol-board, bris′tul-bōrd, *n.* a smooth cardboard.
brit′tle, *adj.* easily broken.
broach, brōch, *v.* to open up: to begin to talk about (e.g. He *broached* the subject of the money).
broad, brawd, *adj.* wide: large: also used to describe a way of speaking that is different from the ordinary (e.g. He speaks *broad* Scots; his accent is *broad*).—*vs.* **broad′cast,** to scatter freely: to send out by wireless; **broad′en,** to make or grow broad or broader. —*ns.* **broad′ness; broad′side,** the side of a ship: all the guns on one side of a ship of war firing at the same time: a sheet of paper printed on one side; **broad′sword,** a sword with a broad blade.
brocade, brok-ād′, *n.* a silk cloth on which fine patterns are sewn.
broc′coli, *n.* a kind of cauliflower.
brochure, bro-shoor′, *n.* a small book.
brock, *n.* a badger.
brogue, brōg, *n.* a strong shoe: a broad way of saying words.
broil, *v.* to cook over hot coals: to grill.—*n.* a noisy quarrel.
brō′ker, *n.* one who buys and sells for others: a second-hand dealer.
bronchitis, bron-kī′tis, *n.* an illness (affecting the windpipe) in which breathing is difficult.—*adj.* **bronchial** (bron′ki-al), having to do with the windpipe.
broncho, bronco, brong′ko, *n.* a half-tamed horse.
bronze, *n.* a mixture of copper and tin.—Also *adj.*
brooch, brōch, *n.* a fancy safety-pin, esp. one set with jewels.
brood, *v.* to sit as a hen on eggs: to think anxiously for some time.—*n.* children or family: the number (e.g. of chickens) hatched at once.
brook, *n.* a small stream.
brook, *v.* to bear or endure.
broom, *n.* a well-known plant, with yellow flowers: a brush for sweeping.—*n.* **broom′stick,** the handle of a broom.
brose, *n.* a food made by pouring boiling water or milk on oatmeal, with salt and butter added.
broth, *n.* soup made with vegetables.
brother, bruth′er, *n.* a male born of the same parents as one's self:—*pl.* **broth′ers,** sometimes **breth′ren.** —*adj.* **broth′erly,** like a brother: kind: affectionate.—*n.* **broth′er-in-law,** the brother of a husband or wife: a sister's husband.
brow, *n.* the forehead: the edge of a hill.—*v.* **brow′beat,** to frighten with stern looks or speech: to bully.
brown, *adj.* of a dark colour (something between red and yellow): sunburnt.—Also *n.*
brown′ie, *n.* a helpful fairy or goblin: a member of the junior Girl Guides, having a brown uniform.
browse, *v.* to feed on the shoots or leaves of plants: to read.
bruin, broo′in, *n.* a name for a bear.
bruise, brooz, *v.* to crush by beating: to beat into small pieces.—*n.* a wound, with skin crushed and darkened in colour, made by a blow or a fall.
brunette, broon-et′, *n.* a woman with brown or dark hair.
brunt, *n.* the force of a blow.
brush, *n.* an instrument for removing dust: a slight fight, a skirmish or encounter: the tail of a fox. —*v.* to remove dust, etc. by sweeping: to touch lightly in passing.—*n.* **brush′wood,** rough close bushes: a thicket.
brusque, broosk or brusk, *adj.* sharp and short in manner, rude.—*n.* **brusque′ness.**
brus′sels, *n.* a kind of carpet.—*n.pl.* **bruss′els-sprouts,** a kind of cabbage with sprouts like small cabbages on the stem.
brute, broot, *n.* an animal: a cruel person.—*adj.* **brut′al,** like a brute, cruel.—*n.* **brutal′ity.**—**brute strength,** great strength.
bub′ble, *n.* a bladder of water blown out with air: a cheating scheme. —*v.* to rise in bubbles.

buccaneer′, *n.* an old-time pirate.—*n.* **buccaneer′ing.**

buck, *n.* the male of the deer, goat, hare, and rabbit.—*n.* **buck′skin**, a soft leather made of deerskin or sheepskin.

buck′et, *n.* a container for water, etc.

buck′le, *n.* a clip (of metal, etc.) for fastening straps or bands.—*v.* to fasten with a buckle.—*n.* **buck′ler**, a small shield.

buck′ram, *n.* coarse cotton or linen.

bud, *n.* the first shoot of a tree or plant.—*v.* to put forth buds.—*adj.* **bud′ding**, showing signs of becoming (e.g. a *budding* author).

budge, buj, *v.* to move or stir.

budgerigar′, *n.* a kind of small parrot. Often shortened to **budgie.**

budget, buj′et, *n.* a sheaf of papers or heap of letters: the sum of money set aside each year by Parliament to pay for the country's army, navy, schools, etc.

buff, *n.* a kind of soft leather: a military coat: a light yellow colour.

buf′falo, *n.* a kind of ox.

buf′fer, *n.* something which lessens the force of a blow or collision (e.g. the springs at ends of a railway carriage).

buf′fet, *n.* a slap or a blow.—*v.* to strike with the fist, to slap: to struggle against.

buffet, boo′fā, *n.* a counter where food and drink may be got: a kind of sideboard.

buffoon′, *n.* a clown: a fool.—*n.* **buffoon′ery**, silly behaviour, clowning.

bug, *n.* a name for any small nasty insect.—*n.* **bugbear** (bug′bār), a thing that frightens or annoys: the thing one hates most (e.g. Spelling was his *bugbear*).

bug′gy, *n.* a kind of light horse-carriage, a gig.

bugle, bū′gl, *n.* a hunting-horn: a small trumpet.—*ns.* **bū′gler**, one who plays upon the bugle; **būgle-call**, in the army, a short tune played on the bugle as a signal.

build, bild, *v.* to put together the parts of anything (e.g. a house, bridge, aeroplane).—*n.* **build′ing.**—**build′ing soci′ety**, a kind of bank which lends people money for building houses.

bulb, *n.* the ball-shaped part of plants like the hyacinth, tulip, onion, etc., containing a store of food for the young plant which is inside: an electric-light lamp.—*adj.* **bul′bous**, ball-shaped.

bulge, bulj, *n.* a swelling.—*v.* to swell out.—*adj.* **bul′gy.**

bulk, *n.* size: the greater part.—*v.* to be of importance.—*adj.* **bulk′y**, taking up much room.

bulk′head, *n.* a wall in the inside of a ship, meant to keep out water in a collision.

bull, bool, *n.* the male of the ox family, also of the whale, walrus, elephant, moose, etc.—*ns.* **bull′-dog**, a kind of dog, strong in body and fierce-looking, once used for worrying bulls; **bull′-terr′ier**, a dog something like a bulldog; **bull's-eye**, the mark in the middle of a target: a striped sweet.

bull, bool, *n.* a command or order from the Pope, written in Latin.

bulldozer, *n.* a machine for levelling land and clearing away obstacles.

bullet, bool′et, *n.* the ball of lead or other metal fired from a pistol or rifle.—*adj.* **bull′et-proof**, not able to be pierced by bullets.

bulletin, bool′e-tin, *n.* a short news report: a report telling how a sick person is getting on.

bullion, bool′yun, *n.* gold and silver in bars before being made into coins.

bully, bool′i, *n.* one who uses his size and strength to hurt or frighten those who are weaker.—Also *v.*

bulrush, bool′rush, *n.* a large strong reed which grows on wet land or in water.

bulwark, bool′wark, *n.* the part of a ship's side above the deck: anything strong for defence.

bum′ble-bee, *n.* a large kind of bee that makes a humming noise.

bump, *v.* to make a heavy noise: to strike with a dull sound.—Also *n.*—*n.* **bump′er**, a cup or glass filled to the brim.—*adj.* full up.

bump′kin, *n.* a clumsy country fellow.

bumptious, bump′shus, *adj.* [illegible] portant: meddling, [illegible]

bun, *n.* a kind of cake: [illegible] mass of hair.

bunch, bunsh, *n.* a number of things tied together or growing together.—*v.* to crowd together.

bun'dle, *n.* a number of things loosely bound together.—*v.* to tie in a bundle: to push roughly.

bung, *n.* the stopper of the hole in a barrel: a large cork.—*v.* to stop up with a bung.—*n.* **bung'-hole**, a hole in a cask through which it is filled, closed by a bung.

bungalow, bung'ga-lō, *n.* a house of one storey, usually standing by itself.

bungle, bung'gl, *v.* to do a thing badly or clumsily.—Also *n.*

bunion, bun'yun, *n.* a lump or swelling on the foot.

bunk, *n.* a sleeping-place, such as that in a ship's cabin.—*n.* **bunk'er**, a large box used for keeping such things as coals: a sand-pit on a golf-course.

bunk'um, *n.* foolish talk or writing: nonsense.

bun'ny, *n.* a pet name for a rabbit.

bunt'ing, *n.* a thin cloth used for making flags.

bunt'ing, *n.* a bird of the finch family.

buoy, boi, *n.* a floating mark which acts (by its shape, colour, light, sound, etc.) as a guide or as a warning for ships: something which acts as a float (e.g. a *life-buoy*).—*v.* to keep afloat, bear up: to cheer up.—*n.* **buoy'ancy**, lightness (making floating easy).—*adj.* **buoy'ant**, light, cheerful.

bur, burr, *n.* the prickly seed-case or head of certain plants.

bur'den, *n.* a load: cargo: something difficult to bear (e.g. blame, sin, sorrow): the chorus or refrain of a song.—*adj.* **bur'densome**, heavy.

bureau, bū-rō', *n.* a writing-table: a room or office where such a table is used: an office:—*pl.* **bureaux, bureaus** (bū-rōz').

burette, bū-ret', *n.* a glass tube for measuring liquids.

burgh, bur'a, *n.* a Scottish word meaning the same as the English **borough**.—*ns.* **burgher** (burg'er), a dweller in a borough; **burgess** (bur'jes), one who has certain rights in a borough.

burg'lar, *n.* one who breaks into a house by night to steal.—*n.* **burg'lary**.

burial, ber'i-al, *n.* See **bury**.

burlesque, bur-lesk', *n.* a piece of writing, acting, or drawing, making fun of somebody.

bur'ly, *adj.* broad and strong.—*n.* **bur'liness**.

burn, *n.* a small stream or brook.

burn, *v.* to waste by fire: to be on fire: to feel very angry.—*n.* a hurt or mark caused by fire.—*ns.* **burn'er**, the part of a lamp or gas-jet from which the flame rises; **burnt'-off'ering**, something burned upon an altar as a sacrifice.

burn'ish, *v.* to polish.—Also *n.*—*n.* **burn'isher**, an instrument for polishing metal.

burrow, bur'ō, *n.* a hole in the ground dug by certain animals (e.g. rabbits, moles, foxes).—*v.* to make holes in the ground.

bur'sar, *n.* in English schools and colleges, the one who collects fees and pays bills, the treasurer: in Scotland, one who (usually by examination) wins a money prize to pay for his schooling or other studies.—*n.* **burs'ary**, in Scotland, the money paid to a bursar.

burst, *v.* to break into pieces: to break open suddenly.—Also *n.*

bury, ber'i, *v.* to hide in the ground: to place a dead body in the ground.—*n.* **bur'ial**.

bus, *n.* short for **omnibus**.

busby, buz'bi, *n.* a fur hat worn by mounted soldiers.

bush, boosh, *n.* a plant thick with branches: forest: wild, desert country.—*adj.* **bush'y**, full of bushes: like a bush.—*n.* **bush'-ranger**, in Australia, an outlaw living in the wilds.

bushel, boosh'el, *n.* a measure (8 gallons) for measuring grain, fruit, etc.

business, biz'nes, *n.* one's work or job: trade (e.g. *Business* is good just now): something that concerns a person (e.g. This is my *business*).

bus'kin, *n.* a kind of boot reaching to below the knee.

bust, *n.* a statue, painting, or photograph, showing the head and

shoulders of a person: the part of the human body above the waist.

bus'tard, *n.* a kind of bird something like the crane.

bustle, bus'l, *v.* to busy one's self noisily.—Also *n.*

bustle, bus'l, *n.* a stuffed pad once worn by ladies under the skirt of their dress.

busy, biz'i, *adj.* working hard: active.—*adv.* **bus'ily.**—*ns.* **bus'iness;** **bus'ybody,** one busy about others' affairs, a meddling person.

butcher, booch'er, *n.* one whose work is to kill animals for food: one who delights in killing and slaughtering.—*v.* to kill cruelly.—*n.* **butch'ery,** great or cruel slaughter.

but'ler, *n.* a man-servant who looks after the wines, etc., and who serves them.

butt, *v.* to strike with the head.

butt, *n.* a large cask: a target for archers: the mound of earth behind rifle-targets to catch wide shots: one of whom others make fun: the thick heavy end of a stick, rifle, etc.

but'ter, *n.* a fatty food made by churning cream.—*v.* to spread over with butter.—*ns.* **but'ter-milk,** the milk that is left after butter has been made; **but'tercup,** a plant with a cup-like flower of a golden yellow; **but'terfly,** a winged insect with large and beautiful wings: a gay, light-hearted person; **but'ter-scotch,** a kind of toffee made with butter.

but'tery, *n.* a storeroom in a house for wines, ale, etc.—*n.* **but'tery-bar,** the ledge for holding drinking-vessels in the buttery.

but'ton, *n.* a knob of metal, bone, etc., used to fasten the dress: the knob of an electric bell, etc.: (*pl.*) a young boy servant in uniform, a page-boy.—*v.* to fasten by means of buttons.

but'tress, *n.* a support (e.g. on the outside of a wall).—*v.* to support, as by a buttress.

bux'om, *adj.* gay, lively, jolly.

buy, bī, *v.* to get something by giving money for it.—*n.* **buy'er.**

buzz, *v.* to make a humming noise like bees.—Also *n.*

buz'zard, *n.* a bird of prey like a falcon.

by, bī, *prep.* and *adv.*—*adv.* **by'-and-by,** soon, presently.—*ns.* **by'-election,** an election for parliament or town-council to appoint a member in place of one who has died or has given up his place; **by'-law,** a law made by a town or club; **by'name,** a nick-name; **by'path, by'road, by'way,** a side road; **by'-pro'duct,** something useful obtained during the manufacture of something else (e.g. Coke is a *by-product* obtained when gas is made from coal); **by'stander,** a looker-on; **by'word,** a common saying: something mocked at.—*adj.* **by'-gone,** past.—*n.pl.* **by-gones,** happenings that are over and done with.

bye, bī, *n.* in cricket, a ball sent past the wicket: a run made from such a ball.

byre, bīr, *n.* a cow-house.

C

cab, *n.* a hired carriage, horse-drawn or motor-driven (*taxi-cab*).

caballero, ka-bal-yā'rō, *n.* a Spanish gentleman.

cabaret, kab'a-rā, *n.* a restaurant, with dancing, singing, etc.

cabbage, kab'āj, *n.* a well-known vegetable.

cab'in, *n.* a hut or cottage: a small room, esp. in a ship, for officers or passengers.—*n.* **cab'in-boy,** a boy who looks after the cabins of a ship.

ca'binet, *n.* a small room: a fancy wooden case with drawers: a cup-board with shelves and doors (e.g. china *cabinet*): a number of states-men who advise the king and who really govern the country.

cable, kā'bl, *n.* a [illegible] chain: a line of [illegible] graph wires laid [illegible] a message or [illegible] such a line: an [illegible] wire (e.g. electric [illegible] telegraph by [illegible] gram, a [illegible]

cabriolet, kab′ri-ō-lā, *n.* a light carriage.
cacao, ka-ka′o or ka-kā′o, *n.* a tree from whose seeds cocoa and chocolate are made.
cachalot, kash′a-lot, *n.* a kind of whale.
cache, kash, *n.* a hiding-place for treasure, stores, ammunition, etc.: the stores hidden.
cachet, kash′ā, *n.* a seal (e.g. for a letter).
cachinnation, kak-in-ā′shun, *n.* loud laughter.
cack′le, *n.* the sound made by a hen or goose.—Also *v.*
cacophony, ka-kof′ō-ni, *n.* an unpleasant sound.
cac′tus, *n.* a prickly plant.
cad, *n.* a low, mean fellow: a sneak.
cadaverous, ka-dav′er-us, *adj.* looking like a dead body: sickly-looking.
caddie, kad′i, *n.* one who attends a golfer at play, carrying the clubs.
cad′dy, *n.* a small box for holding tea.
cadence, kā′dens, *n.* the fall of the voice at the end of a sentence: pleasant rise and fall of sound.
cadet′, *n.* the younger or youngest son: a member of the younger branch of a family: a youth studying to be an officer in the army or navy: a schoolboy who takes military training.
cadge, kaj, *v.* to beg, or go about begging.—*n.* **cadg′er.**
café, kaf′ā, *n.* a tea-shop, a restaurant.
caffeine, kaf-ē′in, *n.* a drug.
cage, kāj, *n.* a box made of wire and wood for holding birds or animals: in a mine, a lift used by the miners.—*v.* to close up in a cage.
cairn, kārn, *n.* a heap of stones, esp. one raised over a grave, or as a mark on a mountain-top.
caisson, kās′on, *n.* an ammunition wagon: a strong case for keeping out the water while the foundations of a bridge are being built.
caitiff, kā′tif, *n.* a mean fellow.
cajole, ka-jōl′, *v.* to coax: to cheat by flattery.—*n.* **cajol′ery.**
cake, *n.* a small loaf of fine bread: sweetened, fancy bread: anything pressed flat (e.g. a *cake* of soap).
cal′abash, *n.* a tree with a melon-like fruit: the shell of this fruit, often used for carrying water, etc.
calam′ity, *n.* a great misfortune.—*adj.* **calam′itous.**
calcareous, kal-kā′re-us, *adj.* having to do with chalk or lime.
calcium, kal′si-um, *n.* a substance which forms the chief part of lime.
calculate, kal′kū-lāt, *v.* to count or reckon: to think out.—*adjs.* **cal′culating**, thinking selfishly; **cal′culable**, able to be counted or measured. — *n.* **calculā′tion**, a reckoning, a sum.
caldron. See **cauldron.**
cal′endar, *n.* a table or list showing the year divided into months, weeks, days, etc.
cal′ender, *n.* in a laundry or paper-mill, a machine for giving a polished finish: a cloth-presser.
calf, kahf, *n.* the young of the cow, elephant, and whale: calf-skin leather: the back of the lower part of one's leg:—*pl.* **calves** (kahvz).
calibre, kal′i-ber, *n.* the measurement across the opening of a tube or gun: power.
cal′ico, *n.* a cotton cloth.—Also *adj.*
calif, caliph, khalif, kā′lif or kal′if, *n.* a Turkish ruler (the name taken by those who ruled after Mohammed).—*n.* **cal′ifate, cal′iphate**, the rank or government of a calif.
caligraphy. See **calligraphy.**
cal′ipers, *n.pl.* an instrument like compasses, used for measuring thicknesses of tubes, etc.
caliph, caliphate. See **calif.**
calk, *v.* See **caulk.**
calk, kawk, *n.* a pointed piece of iron on a horse-shoe to prevent slipping.
call, kawl, *v.* to cry aloud: to make a short visit: to name: to summon.—Also *n.*—*n.* **call′ing**, one's trade or job.—**a close call**, a narrow escape.
cal′ler, *adj.* fresh.
calligraphy, caligraphy, kal-lig′ra-fi, *n.* handwriting, esp. beautiful handwriting.
callous, kal′us, *adj.* unkind: hard-hearted. — *ns.* **call′ousness; callos′ity**, a hard swelling on the skin.

callow, kal'ō, *adj*. not covered with feathers: not having much experience: simple.

calm, kahm, *adj*. still or quiet.—*n*. absence of wind: quietness: peacefulness.—*v*. to make peaceful.—*n*. **calm'ness.**

calorie, kal'or-i, *n*. a measure of heat.—*n*. **calorim'eter**, an instrument for measuring heat.

calumet, kal'ū-met, *n*. the 'peace pipe' of the North American Indians.

calumny, kal'um-ni, *n*. an untruth which hurts a person's good name.—*v*. **calum'niate**, to say untrue things about a person.—*ns*. **calum'niātion; calum'niātor.**—*adj*. **calum'nious.**

Cal'vary, *n*. the name of the place where Jesus was crucified.

calve, kahv, *v*. bring forth a calf.

calypso, ka-lip'sō, *n*. a West Indian folk-song made up as the singer goes along.

calyx, calix, kal'iks or kā'liks, *n*. the outer covering or cup of a flower.

cam'ber, *n*. a slight curve or bulge on a road, etc., making the middle higher than the sides.

cambric, kām'brik, *n*. a kind of fine white linen.

cam'el, *n*. an animal of Asia and Africa with a humped back, used as a beast of burden and for riding.—**camel's hair**, the hair of the camel: the hair of the squirrel's tail used for paint-brushes.

cam'elopard, *n*. the giraffe.

cameo, kam'ē-ō, *n*. a gem or precious stone on which a carved figure or design stands out:—*pl*. **cam'eos.**

cam'era, *n*. an instrument for taking photographs.—**in camera**, in private.

cam'isole, *n*. a woman's under-bodice.

cam'omile, *n*. a plant, or its dried flowers, used in medicine.

camouflage, kam'oo-flazh, *n*. a trick to deceive an enemy (e.g. the painting of a ship in odd colours so that it cannot be seen easily at a distance).—Also *v*.

camp, *n*. the ground on which an army pitch their tents: the tents of an army: a fixed military station, as at Aldershot: any sleeping-place or stopping-place for explorers, hikers, etc.—*v*. to encamp or pitch tents.

campaign, kam-pān', *n*. a war or part of a war: a number of meetings, speeches, etc. for a special purpose.—*n*. **campaign'er**, one who has served in campaigns: a tried soldier.

campanile, kam-pan-ē'lā, *n*. a tower with pealing bells.

campanula, kam-pan'ū-la, *n*. a family of bell-like flowers, the best-known kinds being the harebell or Scottish bluebell and the Canterbury bell.

camphor, kam'for, *n*. a solid oil, got from the camphor laurel tree of India, China, and Japan; it has a strong smell.—*adj*. **cam'phorāted**, containing camphor.

can, pres. tense of v. *to be able*. **I can**=*I am able to*.

can, *n*. a tin case for holding liquids.—*v*. to put (food) into a closed tin to keep it from going bad.—*n*. **can'nery**, a place where food is canned.

canal', *n*. a waterway (for ships or barges) made by man.—*v*. **can'alise**, to build up the banks of a river and deepen it, so that boats may use it easily.

canard, ka-nar', *n*. a false rumour.

canary, ka-nā'ri, *n*. a light sweet wine from the *Canary* Islands: a song-bird (finch) found in the Canary Islands.—*adj*. canary-coloured, bright yellow.

cancel, kan'sel, *v*. to stroke out by crossing with lines: to put off (e.g. The picnic was *cancelled* owing to bad weather).

cancer, kan'ser, *n*. a disease which eats away the body.—*n*. **Cancer**, a group of stars.

candelabrum, kan-de-lā'brum, *n*. a branched and ornamented candlestick:—*pl*. **candelā'bra.**

can'did, *adj*. saying just what one thinks, frank.—*n*. **candour.**

can'didate, *n*. one who tries for a situation or a position, or who enters for an examinatic etc.—*n*. **can'didature.**

can'died. See **candy**

can'dle, *n.* wax stalk, containing a wick, used for giving light.—*ns.* **can'dle-light**; **can'dle-pow'er**, the amount of light given by one candle; **can'dle-stick**, a holder for a candle.

Can'dlemas, *n.* the beginning of February: a day (2nd February) on which special services are held in Roman Catholic churches.

candour, kan'dur, *n.* See **candid**.

can'dy, *n.* a sweet made of sugar: anything preserved in sugar.—*v.* to preserve or cover with sugar. —*adj.* **can'died**.

cane, *n.* the stem of certain plants (e.g. bamboo and sugar-cane): a walking-stick.—*v.* to beat with a cane.—*ns.* **cane'-sū'gar**, sugar got from the sugar-cane; **cān'ing**, a thrashing with a cane.

canine, ka-nīn' or kā'nīn, *adj.* having to do with dogs.—**canine teeth**, the four sharp-pointed teeth, one on each side of the upper and lower jaw.

can'ister, *n.* a box or case, usually of tin, for holding tea, etc.

can'ker, *n.* a spreading sore: a disease in trees, plants, etc.

can'nel, *n.* a kind of coal.

can'nibal, *n.* a savage who eats human flesh.—*n.* **cann'ibalism**, the habit of eating human flesh.

can'non, *n.* a great gun used in war: a stroke in billiards.—*v.* to make a cannon at billiards: to collide. —*ns.* **cannonade'**, an attack with cannon; **cann'on-ball**, a ball to be shot from a cannon.

can'ny, *adj.* knowing: wise: careful with money.—*n.* **cann'iness**.

canoe, ka-noo', *n.* a boat made of the hollowed trunk of a tree, or of bark or skins: a light boat driven by paddling.—**to paddle one's own canoe**, to do things for one's self.

cañon, kan'yon, *n.* a deep hollow between high and steep banks.

can'on, *n.* a law or rule: a standard to judge by: a clergyman of the English or Roman Catholic Church whose duties are connected with the cathedral: a list of saints.—*v.* **can'onise**, to put someone on the list of saints.

can'opy, *n.* a covering over a throne, bed, pulpit, etc.

cant, *n.* words understood by a particular class only (e.g thieves' *cant*): talk which is not sincere.

cant, *n.* a slope.—*v.* to tilt something from a level position.

cantaloup, kan'ta-loop, *n.* a kind of melon.

cantankerous, kan-tang'ker-us, *adj.* cross: quarrelsome.

canta'ta, *n.* a story (usually from the Bible) which is set to music and sung.

canteen', *n.* a place where soldiers, sailors, or workmen can obtain food and drink: a box containing a set of knives, forks, and spoons.

can'ter, *n.* an easy gallop.—*v.* to move at an easy gallop.

canticle, kan'ti-kl, *n.* a short song or hymn.

cantilever, kan'ti-lēv-er, *n.* a large bracket used in building for holding up heavy parts like balconies and stairs. (The same plan has been used in bridge-building—the Forth Bridge is made up of three pairs of giant *cantilevers* fixed back to back.

can'to, *n.* a part of a long poem.

can'ton, *n.* a part of a country, something like our shire (Switzerland is divided into twenty-two *cantons*).—*n.* **canton'ment**, a camping-place for soldiers: (in India) a town for soldiers.

cant'rip, *n.* a tricky joke: a witch's spell.

can'vas, *n.* a coarse cloth used for sails, tents, etc., and for painting on: the sails of a ship.

can'vass, *v.* to go round asking for votes, money, etc.: to talk about. —*n.* **can'vasser**, one who, during an election, asks the promise of votes: one who seeks orders for goods, books, newspapers, etc.

canyon. Same as **cañon**.

caoutchouc, kowt'shook, *n.* india-rubber.

cap, *n.* a soft head-dress without brim (e.g. that of a schoolboy): a cover: a person who has won a cap for his skill in football, cricket, etc.—*v.* to put on a cap: to give a university degree to: to choose a player for an important match.

capable, kāp'a-bl, *adj.* able: fitted or suitable for.—*n.* **capabil'ity**.

capacity, kap-as'i-ti, *n.* power of understanding or being able to do a thing: the amount that a barrel, tank, hall, etc. can hold. —*adj.* **capā'cious**, roomy: wide.

cap-à-pie, kap-a-pē', *adv.* (of a knight's armour) from head to foot.

cape, *n.* a covering for the shoulders.

cape, *n.* a point of land running into the sea.

caper, kā'per, *n.* the flower-bud of a bush that grows in Italy (used to make caper-sauce).

caper, kā'per, *v.* to leap: to dance about.—*n.* a leap: a prank.

capercailzie, kā-per-kāl'yi, *n.* a kind of grouse, almost as large as a turkey.

capil'lary, *adj.* very fine, like a hair. —*n.* a tube with a very narrow opening.

cap'ital, *adj.* having to do with the head: chief: excellent.—*n.* the top part of a column or pillar: the city from which a country is governed: a large letter: goods or money for carrying on any business.—*n.* **cap'italist**, one whose money is used for carrying on a business.—**capital punishment**, punishment by death, execution; **capital ship**, a large warship.

Cap'itol, *n.* a lofty temple in old-time Rome: in America, the house where parliament meets.

capitulate, kap-it'ūl-āt, *v.* to give in, after making a treaty.—*n.* **capitulā'tion.**

cā'pon, *n.* a young fattened cock.

caprice, ka-prēs', *n.* a sudden change of mind: a sudden fancy.—*adj.* **capricious** (kaprish'us), changing often: taking sudden fancies.

Cap'ricorn, *n.* a group of stars.

capsize', *v.* to upset: to overturn.

cap'stan, *n.* on a ship or quay, a machine turned by spokes or by a steam-engine, used for winding or hauling.

cap'sūle, *n.* the seed-case of a plant: a small case for holding a dose of medicine.

cap'tain, *n.* the commander of a troop of horse, a company of infantry, or a ship: the leader of a team or club: the head-boy of a school.—*v.* to lead.—*n.* **cap'taincy**, the rank of a captain.

caption, kap'shun, *n.* a heading (in newspapers, etc.).—*adj.* **captious** (kap'shus), ready to find fault.

cap'tivate, *v.* to charm.

captive, kap'tiv, *n.* a prisoner, esp. a prisoner of war.—*adj.* taken or kept prisoner: not free.—*ns.* **captiv'ity**, the state of being a prisoner; **cap'tor**, one who takes a prisoner; **cap'ture**, the act of taking: the thing taken: an arrest.—*v.* to take by force.

car, *n.* a carriage on wheels, esp. a motor-car.

carabine. See **carbine.**

carafe, ka-raf', *n.* a water-bottle for the table.

car'amel, *n.* brown sugar melted: a kind of sweet, made of chocolate, sugar, and butter.

car'at, *n.* a measure of the purity of gold—12 carat, 18 carat, etc., up to 24 carat (pure gold): a measure of weight used in weighing gems.

car'avan, *n.* a number of merchants, travellers, etc. crossing the desert together for safety against attack from robbers: a house on wheels. —*n.* **caravan'sary** or **-serai**, an inn where caravans stop.

car'away, *n.* a plant whose seeds are used to flavour cakes, etc.

car'bine, *n.* a short light musket—also **car'abine**.—*n.* **carbineer'**, **carabineer'**, a soldier armed with a carbine.

carbol'ic a'cid, *n.* an acid used to kill germs.

car'bon, *n.* a substance of which charcoal is an example.—*adjs.* **carbonā'ceous**, **carbon'ic**, made of carbon; **carbonif'erous**, producing or containing coal.—*v.* **car'bonise**, to make into carbon.

car'buncle, *n.* a fiery-red precious stone: a painful boil.

carburet'ter or **carburet'tor**, *n.* the part of a motor-car engine which changes the petrol into vapour.

carcass, carcase, kar'kas, *n.* the dead body of an animal.

card, *n.* a piece of pasteboard (e.g. one used for playing the game of *cards*; or one with a person's address upon it.—*n.* **cards**, a table game played with a pack of cards (usually 52 in number).

break up (print) 1 To unlock a form and distribute the furniture and other materials back into their various receptacles 2. To break up a form for colors—to separate the parts which are to print the different colors to divide it for two or more printings

breast beam (ship) The beam in the poop and forecastle decks, the beams nearest the amidships from the decks.

breast beam (text) A bar at the front of the loom over which the warp passes before being wound on the cloth beam

breast hook (ship) A triangular shaped plate fitted between decks connecting panting stringers in the bow for the purpose of rigidly fastening the stem and shell plating A wood or metal knee fitted behind the stem structure

breathing (aer) The passage of air into or out of an aerostat due to changing volume

breathing stresses (aer) Stresses produced in an aerostat by breathing They are of importance in the envelope and keel of a semi-rigid airship, due to the interaction of the envelope and keel when the envelope breathes.

brick kiln. Sometimes called brick oven. A beehive oven used for firing bricks.

bridge (el) An instrument which embodies part or all of a bridge circuit, and by means of which one or more of the electrical constants of a bridge circuit may be determined The operation of a bridge consists of the insertion of a suitable electromotive force and a suitable detecting device in branches which can be made conjugate and which do not include the branch whose constants are to be determined, followed by the adjustment of one or more of the remaining branches until the response of the detecting device becomes zero or an amount measurable by the detector for the purpose of interpolation

bridge (ship) A partial deck extending from side to side of a vessel amidships It is common in steam vessels affording a convenient station for the officer in command. It is also known in England as the hurricane or bridge deck

bridge circuit (el) A network which is so arranged that, when an electromotive force is present in one branch, the response of a suitable detecting device in another branch may be made zero by a suitable adjustment of the electrical constants of still other branches, and which is characterized by the fact that, if the electromotive force and the detecting device are interchanged, after completing an adjustment, the response of the detecting device is still zero

bridge deck (ship) A partial deck extending from side to side of ship about amidships

bridge house (ship) The erection or superstructure fitted about amidship on the upper deck of a ship The officers' quarters, staterooms, and accommodations are usually in the bridge house

bridging (carp) Pieces fitted in pairs from the bottom of one floor joist to the top of adjacent joists, and crossed to distribute the floor load, sometimes pieces of width equal to the joist and fitted neatly between them.

bridle (aer) 1 A sling of cordage or cable which has its ends fixed at two different points, to the bight of which a single line may be attached, either movable or fixed, thus distributing the pull of the single line to two points or more in the case of a multiple bridle. 2 A towing or mooring line having two legs and intended to reduce yawing when towing or mooring

Brigg's logarithms (math) See common logarithms

brightness (B) The luminous intensity of any surface in a given direction per unit of projected area of the surface as viewed from that direction.

brine (chem) The salt solution which is electrolyzed for producing alkali, chlorine, hypochlorites or other allied products

Brinell number (StM) Ratio of load on a sphere used to indent the material to be tested to the area of the spherical indentation produced The standard sphere

used is a 10 mm. diam. hardened steel ball. The loads used are 3000 kg. (6615 lb) for steel and 500 kg. (1102 lb) for softer metals, and the time of application of load is 30 sec. Values shown in the tables are based on spherical areas computed in the main from measurements of the diameters of the spherical indentations, by the following formula

$$Bn = \frac{P}{\pi Dt} = \frac{P}{\frac{\pi D}{2}\left(D - \sqrt{D^2 - d^2}\right)}$$

where P equals load in kg., t equals depth of indentation, D equals diameter of ball, d equals diameter of indentation, all lengths being expressed in millimeters. Brinell numbers have a certain relation to tensile strength, and these numbers may be used to determine tensile strengths approximately by employing the proper conversion factor for the material

bring to (nav) The act of stopping a boat by bringing her head up into the wind.

bring up (print) In making ready on press, to put underlays or overlays on the parts where the impression is defective, to bring up to an even and full pressure for printing; to give stronger color or greater distinctiveness.

briquette. A block or brick of coal formed in molds under pressure

bristol board (paper) A class of fine cardboard made in various qualities and thicknesses, usually of smooth finish, used for printing and drawing; so called because first made at Bristol, England.

British thermal unit (B.t.u.) A unit for measuring heat. One British thermal unit equals 778 foot-pounds of work (or energy) It represents the heat required to change the temperature of 1 pound of water through 1° F

brittle materials (StM) Those which show little permanent deformation when stressed to rupture

brittleness (StM) The property of a material which permits little bending or deformation without fracture. Brittleness and hardness are closely associated

[illegible]

[illegible]

[illegible]

broadside (directional) antenna (radio) An antenna array [illegible] at a right angle to the line along which its elements are arranged

brochure (print) A small stitched book in paper covers, containing only a small number of leaves; a booklet

broken line graph (math) Graphic representation by means of which [illegible] relationships or similarities are [illegible] by a broken line

broken pick (text) A [illegible] across the width of the fabric caused by a completely or partially missing pick

bromide paper (phot). Generally used for making enlargements. Is coated with a slow silver bromide emulsion

bronze (metal) An alloy of copper and tin with varying compositions. Some lead or zinc is often included in the alloy and small amounts of other metals are also added. Commercial bronze is generally used in the manufacture of grill work, forgings, hardware, [illegible] bands, screws and rivets. It contains 90% copper and 10% tin. Architectural bronze contains 57% copper, 41% zinc, and 2% lead

brow (ship) A small curved angle or flat plate fitted on the outside of the shell of a ship over an air port to prevent water running down the ship's side from entering the air port

brow plate (ship). A plate forming a [illegible] on the port and starboard and fore and aft sides of 'tween deck hatches. It makes possible trucking cargo up on the 'tween deck hatch cover so that it can be hoisted through the sheltered [illegible] cargo hatch

brown spots (phot) A defect in a negative due to an oxidized developer or to impurities in the washing water

brush (el) A conductor serving to maintain electric contact between stationary and moving parts of a machine or other apparatus

brush holder (el) A device which holds the brush in position

brush yoke (el) A rocker arm, ring, quadrant or other adjustable support for maintaining the brush holders or brush holder studs in their relative positions

B T U Abbreviation for British Thermal Unit. The heat required to raise the temperature of 1 lb of water 1° F when the water is at its maximum density which is at 4° C or 39.2° F

bubbles (phot) See air bells.

bubble sextant (air nav) Any instrument used to measure the vertical angle of celestial bodies from a bubble horizon

bucking tool (sheet metal) A tool which holds the rivet head in place while the riveter flattens the other end For bucking rivets inside of round or oval shape tubular members, in aircraft construction for example, an expanding type bucking tool is used

buckled plate (ship) A plate warped in or out, making it out of line, a plate thicker at the center than at the edges

buckram (book) A kind of thick cloth finished like linen, possessing good wearing quality used for bookbindings

buffeting (aer) The repeated aerodynamic forces experienced by any part of an aircraft, caused and maintained by unsteady flow arising from a disturbance set up by any other part of the aircraft (cf flutter)

buffing (metal) The smoothing of a metal surface by means of flexible wheels to the surface of which fine abrasive particles are applied, usually in the form of a plastic composition or paste

buggy (mining) See bogie

building cradle (aer) A support provided for the frame of a rigid airship or the keel of a semi-rigid airship during construction

building paper (bldg) Cheap, thick paper, used to insulate a building before the siding or roofing is put on, sometimes placed between double floors

building up (print) In electrotyping, after an impression of the form has been made in wax, putting more wax on the places which will show blank in printing, so that these parts of the plate will be deep enough to prevent smutting the paper

build up sequence (weld) The method of depositing a multiple pass weld with respect to its cross section

build up timber (carp) A timber made of several pieces fastened together and forming one of larger dimension.

bulb angle (ship) An angle bar with its long leg terminating in a bulbed toe

bulkhead (ship) A watertight partition extending from the double bottom to the top main deck, so constructed that in case of accident in one compartment, damage is confined to that compartment. A partition in a ship which divides the interior into various compartments

bull ladle (foundry) A ladle of small capacity used in filling small molds with molten metal.

bull ring (el) A metal ring used in overhead construction at the junction point of three or more strain wires.

bulwark (ship) A term applied to the strake of shell plating above a weather or shelter deck It helps to keep the deck dry and also serves as a guard against losing cargo or men overboard

bump (aer) A sudden acceleration of an aircraft caused by a region of unstable atmosphere characterized by marked local vertical components in the air currents

bumper bag (aer). A cushion secured to the bottom of an airship to prevent damage when in contact with the ground

butane (C_4H_{10}) A colorless gas with a natural gas odor It has no corrosive action on metals and does not react with moisture. Used for fuel for household and industrial uses

butcher's linen (text) A firm, bleached linen fabric made of coarse yarns Now made of cotton, for utilitarian purposes

butt (metal) The end surface of a metal bar

butterfly valve (aut) A throttle valve in a carburetor

butt joint (ship) A joint made by fitting two pieces squarely together on the edges, which is then welded or butt strapped

butt joint (weld) A welded joint between two abutting parts lying in approximately the same plane.

buttocks (ship), The traces formed by the intersection of longitudinal vertical planes parallel to the central longitudinal vertical plane of the ship, with the forward and after surface of the ship's hull. These traces, when occurring in the fore body, are called bow lines, and when in the after body, buttock lines However, the term buttocks is often used to denote both bow and buttock lines

butt seam welding A seam welding process with the pieces positioned edge to edge

butt strap (ship) A plate to connect two plates or bars together at the ends

butyl alcohol (chem) A colorless liquid, used in the thinning of lacquers, as a shock-absorbing fluid, and as a hydraulic brake fluid

butyl rubber (chem) A trade name for a hydrocarbon polymer which is obtained as a result of the copolymerization of an olefin and diolefin It resembles natural rubber in the unvulcanized and vulcanized state Butyl rubber is applicable in nearly all uses of natural rubber, and may be used for wire insulation, tires, gas marks, inner tubes, steam hoses and vibration dampers

buzz stick (el). A device for testing suspension insulator units for fault when the units are in position on an energized line It consists of an insulating stick, on one end of which are metal prongs of the proper dimensions for spanning and short-circuiting the porcelain of one insulator unit at a time.

buzzer (el) A signaling apparatus similar to an electric bell, but without hammer or gong, and serving to produce sound by the vibration of an armature

by-pass (aut) A separate passage which permits a liquid or gas to take a course other than that normally used.

by-pass condenser (rad) A condenser which will provide an alternating current path of comparatively low impedance around some circuit element.

by the head (nav) A term applied to a vessel when she is deeper forward than aft.

by the stern (nav) Applied to a vessel when she is deeper aft than forward.

cable (cl) Either a stranded conductor [illegible] (single-conductor cable), or a combination of conductors insulated from one another (multiple-conductor cable). An assembly of conductors with or without a protecting sheath in such structural arrangement of the individual conductors as will permit their use separately or in groups.

cable bond (cl). An electric connection across a joint in the armor or lead sheath of a cable, or between the armor or lead sheath and the earth, or between the armor or sheath of adjacent cables.

cable filler (cl). The material used in multiple conductor cables to occupy the spaces formed by the assembly of the insulated conductors, thus forming a core of the desired shape.

cable joint (el) A connection between two or more separate lengths of cable with the conductors in one length, connected individually to conductors in other lengths, and with the protecting sheaths so connected as to extend protection over the joint. Also called splice.

cable splice (el) A connection between two or more separate lengths of cable with the conductors in one length connected individually to conductors in the other lengths and with the protecting sheaths so connected as to extend protection over the joint.

cable terminal (el) A structure adapted to be associated with a cable, by means of which electric connection is made available for any predetermined group of cable conductors in such a manner as to permit of their individual selection and extension by conductors outside of the cable.

cable twist (text) A twist, cord, or rope construction in which each successive twist is in the opposite direction of the preceding twist, as S/Z/S or Z/S/Z construction.

cadmium (Cd) A metal with a bluish white color, ductile and malleable. It tarnishes in air and burns when heated. Cadmium plating is a competitor of zinc plating, and an undercoat of cadmium plate is frequently used in place of a nickel plate. Cadmium [illegible]

used to replace babbitt bearings in low- and medium power automobile and air craft engines

caisson disease. The bends, compressed-air disease, divers' paralysis, a condition due to too rapid return from pressures about 32 lbs per square inch to atmospheric pressure, which causes too rapid an evolution of gas from tissues. The gas is principally nitrogen The pain is referred to as "bends," the vertigo as "staggers" and the dyspnea as "the chokes" Treatment is by recompression.

calcification (chem) Deposition of insoluble calcium salts

calcination (chem) Driving off of volatile matter by applying heat without the access of air

calcite (min) Certain polarizing optical instruments require crystals of calcite. This was formerly obtained from Iceland but during World War I, the mines were flooded to prevent the calcite from weathering Recently large deposits of this mineral were found in New Mexico The crystals obtained from this deposit were found to be of excellent quality

calcium (Ca) A silver-colored metal occurring as calcium carbonate (limestone), used in the manufacture of steel At. wt. 40 07, at. no 20, m.p 810° C, sp gr 1 85

calcium carbonate ($CaCO_3$) A white powder which is amorphous or crystalline It is obtained when a soluble carbonate is added to a solution of calcium salt. Also found in the natural state as limestone Used as a flux in metallurgy, in the manufacture of lime, in the manufacture of pigments, and in ceramics, glass manufacture, and building stones

caluium hydrate. See slaked lime

calcium hydroxide See slaked lime

calculus (math) A field of higher mathematics divided into differential, infinitesimal, and integral calculus Infinitesimal calculus or ordinary calculus is so called because of its use of infinitesimal quantities It sometimes refers only to that part of the calculus which deals with differentials and sums of infinitesimals. See differential calculus and integral calculus

calender (paper) In papermaking, a machine with rollers between which the sheet is passed to give a smooth finish, when the rolling has been prepared to give a glossy finish, the paper is said to be supercalendered.

calendering (text) A term used for pressing cloth between heavy rollers during the finishing process, for the purpose of giving it a polish

calibrated absolute altitude (air nav) The indicated absolute altitude corrected for instrumental and installation errors

calibrated air speed (air nav) The reading of the air speed indicator, corrected for instrumental and installation errors

calibrated altitude (air nav) The indicated altitude corrected for instrumental and installation errors

calibration scale (el). A set of graduations marked to indicate values, such as current, voltage or time, at which an automatic device can be set to operate

calibration voltage (el) The voltage applied to a watthour meter during calibration or checking

calico printing (text) The process by which cotton cloth, white or unbleached, is printed so that it shows various patterns The simplest method of printing calico or similar material is by the use of engraved blocks pressed on cloth by hand. A separate block is required for each color Calico printing is also done by machinery, a cylinder machine being used. The pattern is engraved on the surface of copper rollers and the cloth is run through the machine in a web, as in a modern newspaper press

California walnut (lumber) A dark brown wood used for furniture and cabinet making

calipers (mach) Measuring tools used for measuring diameters and distances or comparing distances and sizes. The

three common types are, [illegible], angular cut [illegible], and [illegible]. For details see under respective articles.

calk (ship). To [illegible] a [illegible] with a chisel.

calligraphic etching (print). A process of etching in which the design is made [illegible] a pen and ink on a clean copper plate. When dry, the plate is covered with a thin varnish or etching ground, smoked, and then soaked in water to soften the ink, which can then be removed with the varnish by a gentle rubbing, leaving the design to be etched in the usual manner.

callitype (print). A method of making a plate or printing surface by means of typewriting and photo-engraving; a copy print or plate so made.

caloric (phy). See calory.

calorific value (eng). The heat value of fuel.

calorimeter (phy). An instrument for measuring total heat liberated or absorbed.

calorimetry (chem, phy). The determination of the total heat units in a body or involved in a specific chemical reaction. The measurement of heat exchange.

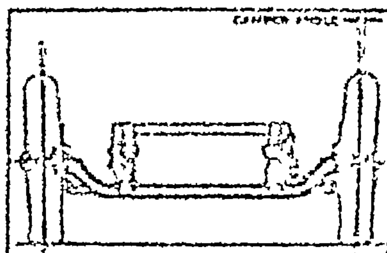
calory (phy) (calorie). The amount of heat which increases the temperature of one gram of water one degree Centigrade (averaged between the freezing and boiling points of water).

calotype (phot). An early type of photograph invented by an Englishman named Fox Talbot in about 1636. The calotype process consisted of making a negative on silver iodide paper. The developed negative was then printed on silver chloride paper.

cam (mech). A rotating or sliding piece of any precise shape, or a projection of definite shape, as on a wheel, either for imparting a desired peculiar movement to a roller moving against its edge, to a pin free to move in a groove on its face, etc., or for receiving motion from [illegible] [illegible] [illegible] [illegible] of [illegible].

cam engine (aero). A type of engine [illegible] by means of a cam and [illegible].

camber (aero). The rise of the curve of an airfoil section, usually expressed as the ratio of the departure of the curve from a straight line joining the extremities of the curve to the length of this straight line. [illegible] camber [illegible] and [illegible] camber [illegible] to the mean line of the section. Camber is positive when the departure is upward and negative when it is downward.



Camber Angle

(Courtesy General Motors Corporation)

camber (aut). To curve or bend; the amount, in inches or degrees, that the front wheels of an automotive vehicle are tilted outward from a true vertical at the top. Motorcycles do not have camber.

camber (ship). The weather decks of ships are rounded up or arched in an athwartship direction for the purpose of draining any water that may fall on them to the sides of the ship where it can be led overboard through scuppers. In brief, the camber is the crown or arch of a weather deck.

cambium (lumber). The soft, formative middle layer of a tree.

camel's hair (text) 1 The hair of the camel. 2. A soft, napped coating usually tan-colored, originally made from the hair of the camel, but now made of good quality wool and dyed to the desired shade

camera (phot) An apparatus for taking pictures In its simplest form it consists of a light-tight box that has at one end a lens and at the other a place to insert a holder containing a sheet of glass or celluloid which has upon it a coating sensitive to light.

camera obscura (phot) This term means a "darkened room" in Latin. Our modern word "camera" is derived from it.

camshaft (aut) A shaft driven by the crankshaft via a train of gears or a silent chain It has cams which regulate the opening and closing of the valves via the tappet rod Some engines have two camshafts, one for regulating the inlet valves and one for regulating the exhaust valves

camshaft timing gears (aut) These gears are keyed to the camshaft and operate the inlet and exhaust valves

can (el) A steel container for the element and electrolyte of a nickel-iron storage cell.

Canada balsam. Oleoresin of the pine *Abies balsamea*, a solution in xylene is used for slide mountings and to cement lens elements

canard airplane (aer) A type of airplane having the horizontal stabilizing and control surfaces in front of the main supporting surfaces

canceling (alg) The subtracting of like-sign terms occurring on both sides of an equation

candle (c) The unit of luminous intensity The unit used in the United States is a specified fraction of the average horizontal candlepower of a group of 45 carbon-filament lamps preserved at the National Bureau of Standards when the lamps are operated at specified voltages This unit is identical within the limits of uncertainty of measurement with the International Candle established in 1909 by agreement between the national standardizing laboratories of France, Great Britain and the United States, and adopted in 1921 by the International Commission on Illumination

candlepower (cp) Candlepower is luminous intensity expressed in candles See candle

cannel coal A massive, non-coking, tough, clean, block coal, of fine, even, compact grain dull luster and commonly conchoidal cross fracture, having a typical low fuel ratio, a high percentage of hydrogen, easy ignition, long yellow flame, black to brown greasy streak, and moderate ash It is essentially a rock derived by solidification and partial distillation or oxidation of water-laid deposits consisting of or containing large quantities of plant spores and pollen grains and more or less cominuted remains of low orders of water plants and animals There may be admixed greater or lesser quantities of mud, woody or peaty material Has frequently been distilled for oil

cant (ship) A term signifying an inclination of an object from a perpendicular, to turn anything so that it does not stand perpendicularly to an object.

cant beam (ship) Any of the beams supporting the deck plating or planking in the overhanging part of the stern of a vessel They radiate in fan shape from the transom beams to the cant frames

cant frames (ship) The frames (generally bulb angles) at the end of a ship which are canted, that is, which rise obliquely from the keel A group of frames extending over the rudder and forming the stern of a ship Those frames which are not at right angles to the keel

cantilever beam (eng) A beam supported at one end only and extending horizontally

cantilever spring (aut) A spring attached at the center to a trunnion on the chassis frame The forward end is shackled to the frame, and the rear end is attached to the axle

canvas (bookb). Also called "duck." A strong, heavy, cotton cloth, [illegible] It can be [illegible] Used for binding the [illegible] of books.

canvas (text). A general name for a class of heavy, [illegible] material made of either cotton or linen. Used for tents, sails, [illegible], and [illegible] [illegible] purposes.

cap (sci). See [illegible]

capacitance (el) That property of a system of conductors and dielectrics which permits the storage of electricity when potential differences exist between the conductors. Its value is expressed as the ratio of a quantity of electricity to a potential difference. A capacitance value is always positive.

capacitive coupling (rad) The association of one circuit with another by means of mutual capacitance.

capacitor (el). A device, the primary purpose of which is to introduce capacitance into an electric circuit. Capacitors are usually classified, according to their dielectrics, as air capacitors, mica capacitors, paper capacitors, etc. Also called condenser.

capacity (aer) The volume of the gas cell or cells of an airship.

capacity (phy) (a) The capacity of a machine, apparatus or device is the rated load. (b). The capacity of a machine, apparatus or device is the maximum load of which it is capable under existing service conditions.

capacity factor (el). The ratio of the average load on a machine or equipment for the period of time considered, to the rating of the machine or equipment.

capitals (print) In printing, the large letters of a font, as distinguished from the small letters. They are in most cases of forms different from the small letters and are derived from the characters used in ancient Roman inscriptions. The small letters, called "lower-case letters" by printers, are derived from various [illegible]

[illegible]

caps and small caps (print) Two sizes of capital letters on one size of type body, common in most fonts of roman letter and often set together in combination [illegible]

[illegible] (aer). A [illegible] the outer edge of a wing [illegible]

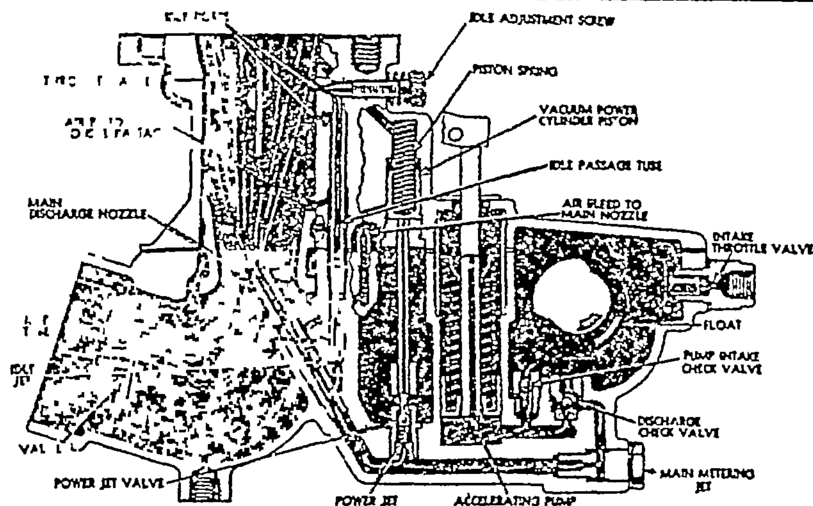
captive balloon. A balloon restrained from free flight by means of a cable attaching it to the earth. Barrage balloons are examples of captive balloons.

car (aer) A structure in, or suspended from, the hull or envelope of an airship for carrying crew, engineers, passengers, etc.

carat. One fifth of a gram. The common unit of weight for diamonds.

carbon (C) The most common element forming hundreds of thousands of compounds, and present in all living things. Carbon compounds are dealt with in the branch of chemistry known as organic chemistry. Common examples of carbon are: charcoal, soot, coal, diamonds, graphite, etc. At. wt. 12.00; at. no. 6; m.p. 3700° C.

carbonaceous. Coaly; containing carbon or coal. For example, shale or rock containing small particles of carbon dis



Diagrammatic View of Up-Draft Carburetor

(Courtesy, General Motors Corporation)

tributed throughout the whole mass would be termed carbonaceous matter

carbon arc cutting (weld) The process of severing metals by melting with the heart of the carbon arc

carbon arc electrode (weld) A carbon or graphite rod through which current is conducted between the electrode holder and the arc.

carbon arc welding An arc welding process wherein one or more carbon or graphite electrodes are used, with or without the use of filler metal.

carbonizing (text) The removal of vegetable material and fibers from fibers and cloths by treatment with acid or acid-producing chemicals and dry heat. Used on woolen materials

carbon microphone (tp) A microphone which depends for its operation upon the variation in resistance of carbon contacts

carbon paper (print) Thin paper coated with a mixture of lampblack and wax, used to duplicate writing or printing on another sheet. The duplicating is done by offsetting the color with pressure on the outside sheet. Also called manifold paper

carbon residue (aut) The carbon remaining after evaporating off the volatile portion of a fuel oil by heating it in the absence of air under controlled test conditions It is an indication of the amount of carbon that may be deposited in an engine

carbon tetrachloride (CCl_4) A colorless non-inflammable liquid possessing a characteristic odor Used as a general solvent, as a refrigerator medium, and as an ingredient of cleaning solutions

carbureting (aut) The process of changing liquid gasoline into a fine spray

carburetion (aut) The metering and mixing of fuels with air and passing the mixture to the engine

carburetor (aut) The mechanism in which the mixture of air and gasoline is made before being injected into the cylinders

DOWNDRAFT CARBURETOR—DIAGRAMMATIC VIEW

(Courtesy General Motors Corporation)

via the intake pipe. A gravity tank and feed pipe supply the gasoline to the carburetor.

carburetor float (aut) See float.

carburetor jet. See jet.

carburizing flame (weld) A gas flame having the property of introducing carbon into the metal heated.

cardan joint (aut). See universal joint.

card compass (aer). A magnetic compass in which the magnets are attached to a pivoted card on which the directions are marked. Also called "card magnetic compass."

carding (text). The mechanical operation of untangling and straightening out textile fibers.

caret (print) A mark used in writing, proofreading etc., to indicate where a word or other matter is to be inserted. This is a caret ‸.

cargo boom (ship) A boom extending from the mast like a derrick arm to handle cargo.

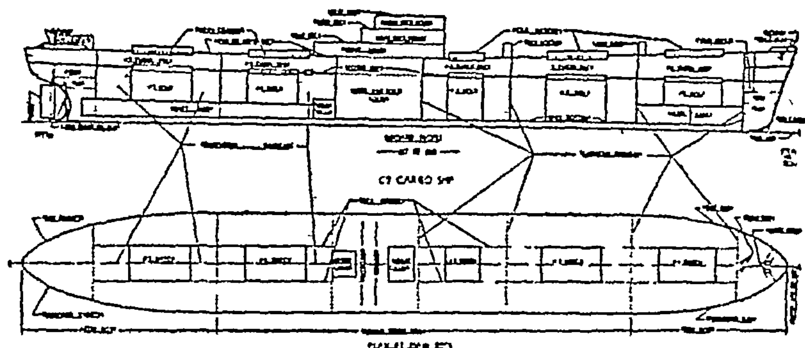
cargo hatch (ship) An opening in a ship's deck for the loading and discharging of any kind of cargo.

cargo port (ship) A large opening in a vessel's side through which cargo is passed on and off.

carling (ship) A fore and aft beam at hatches.

carpenter's level (carp) A tool consisting of a hardwood or metal rectangular block from 12 to 30 inches long with one or more true surface edges. A bubble tube in the end of the level perpendicular to the true surface, is used in plumbing. A bubble tube in the cen-

C-2 CARGO SHIP



(Courtesy, Alabama State Dept. of Education)

ter of the level, parallel to the true surface, is used in leveling

car retarder (RR) A stationary track brake device electrically controlled, for reducing the speed of cars; such as in hump yards, through the medium of friction between brake shoes and the sides of the wheels

carriages (carp) The supports of the steps and risers of a flight of stairs

carrier (rad) An abbreviation frequently used to designate carrier wave, carrier current or carrier voltage

carrier frequency (rad) The frequency of the carrier wave

carrier telephony That form of telephony in which carrier transmission is used, the modulating wave being a voice-frequency wave This term is ordinarily applied only to wire telephony

carrier wave (rad) A wave having those characteristics which are essential in order that the modulated wave may be transmitted through a particular physical system.

cartography Drawing or compiling maps or charts

cartouche (arch) In architecture and decorative design, a tablet for ornament or to contain an inscription, formed like a sheet of paper with the edges rolled

cartridge brass Employed in aircraft construction both in wrought and cast forms As sheet it is used for parts requiring spinning as well as for rubbing strips, propeller tipping, and the like In cast form it is used as fittings for tanks, radiators, heaters, etc This brass has good resistance to corrosion and excellent cold-working qualities. Its name derives from the fact that it is extensively used in the manufacture of cartridge cases It is also known as "70-30 brass"

cascade control (of a street lighting system) A method of turning street lights on and off in sections, each section being controlled by the energizing and deenergizing of the preceding section

case (el), A container for several storage cells. Specifically wood cases are containers for cells in individual jars, rubber or composition cases are provided with compartments for the cells

cased glass Glass composed of two or more layers of different glasses, usually a clear, transparent layer to which is added a layer of opal opalescent or colored glass This glass is sometimes referred to as flashed, multilayed, poly cased, etc.

casehardening (metal) The impregnation of iron with carbon for the purpose of hardening the surface only

casein (chem) A [illegible] in yellowish powder. It is [illegible] from skimmed milk on [illegible] with [illegible] or [illegible] and is also obtained by the [illegible] of the milk. Used in [illegible], where [illegible] replaces the [illegible] drying oils. The casein [illegible] the sizing property and fillers [illegible] the covering power. Used as a [illegible] for plastic gums, [illegible] and [illegible]. Also used in water paints.

casein (paper) An [illegible] substance obtained from milk and vegetable matter used for sizing paper and [illegible] paper in making coated papers. See sizing.

casement (carp) A window in which the sash opens upon hinges.

casing (carp) The trimming around a door or window opening, [illegible] or inside, or the finished [illegible] around a post or beam, etc.

casing (ship) The extra [illegible] bulkhead built around the ship's funnel, engine room, or boiler room to protect the surrounding parts from heat.

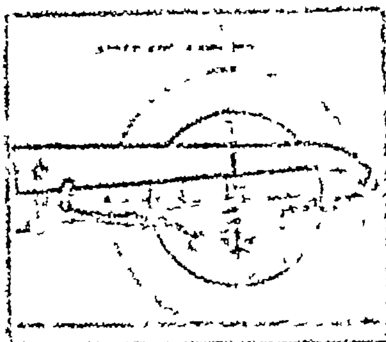
Caslon type (print) An old style roman revived and improved early in the 18th century by William Caslon, an eminent English typefounder. This style of face is now popular and used for many kinds of work.

cassette (radiography) A light-proof holder to contain the sensitized film during exposure to X-rays or gamma rays.

cast (nav) To pay a vessel's head off and bring the wind on the desired side, as to cast to port. Hence to head in a certain direction in bringing up the anchor. To take a sounding or cast the lead. The throw with a heaving line.

caster (aut) The backward tilt (or inclination) of the front axle from a verticle plane.

cast iron (metal) Iron having a high carbon content so that it is brittle and cannot be rolled or forged at any temperature. Also called pig iron.



cast [illegible] (mach) A [illegible] [illegible]

cast steel (metal) [illegible] produced by the [illegible]

caster [illegible] [illegible]

catalysis (chem) The [illegible] of a chemical reaction by the [illegible] of another substance called the catalytic agent or catalyst, which does not [illegible] but [illegible] process.

catalyst (chem) A substance which changes the rate of a reaction [illegible] in process without being consumed by the reaction.

catalytic agent (chem) See catalyst.

catapult (aer) A device by which an airplane can be launched at flying speed.

catch up (print) In planographic or letterpress printing, when the halftone surface of a plate becomes saturated with ink, or when the ink remains between the dots of the plate instead of being carried off by the impression, it is said to "catch up" or "fill up" in the shadows.

catenary system (RR) That form of overhead contact system in which the con

tact wire is supported from one or more longitudinal messengers, either directly by hangers or by hangers in combination with auxiliary conductors and clamps Attachment of the contact wire to the messenger is made at frequent and uniform intervals so as to produce a contact surface nearly parallel to the top of the track rails

catgut. Filaments made from sheep intestines

cathode (el-chem) An electrode through which current leaves any conductor of the non-metallic class Specifically, an electrolytic cathode is an electrode at which positive ions are discharged, or negative ions are formed, or at which other reducing reactions occur

cathode (print) In electrotyping, the negative pole or the path which receives the electrical energy as it leaves the electrolyte or solution. The case is the cathode and receives the copper or nickel deposit.

cathode (rad) (of a vacuum tube) An electrode which is the primary source of an electron stream

cathode ray current (el) A current in a vacuum or in a rarefied gas comprising the movement of negatively charged subatomic particles, usually electrons

cathode-ray oscillograph tube (el) A vacuum tube in which the deflection of an electron beam effected by means of applied electric and/or magnetic fields, indicates the instantaneous values of the actuating voltages and/or currents

cathode ray tube (el) A discharge tube with a thin window at the end opposite the cathode to allow the cathode rays to pass outside Also called "Lenard tube."

cathode rays (el) Streams of electrons emitted from the cathode of an evacuated tube or from the ionized region in proximity thereto, under the influence of an applied voltage

catholyte (el-chem) The portion of an electrolyte in an electrolytic cell adjacent to a cathode If a diaphragm is present, it is the portion of electrolyte on the cathode side of the diaphragm.

cation (el chem) A positive ion in an electrolytic solution which is attracted to the negative pole or cathode.

catwalk (aer) A narrow footway along the keel of a rigid airship

catwalk (ship) To be found on oil tankers An elevated runway from poop to midship, and from midship to forecastle deck. It affords means of safe passage for crew members when the deck is awash in stormy weather

catwalk bridge (ship) On tankers, a narrow walk connecting the forward deck house to the after deck house. On large passenger ships, a bridge having considerable length fore and aft.

caustic potash (chem) Potassium hydroxide

caustic soda (chem) Sodium hydroxide

Caxton black (print) A style of old Flemish black letter used by William Caxton (1477), the first English printer It is still used in a modernized form.

"C" battery (rad) A battery designed or employed to furnish voltage used as a grid bias in a vacuum tube circuit.

ceiling (aer) Height of the lower level of a bank of clouds above the ground.

ceiling (carp) Narrow, matched boards, sheathing of the surfaces that inclose the upper side of a room

ceiling (met) The vertical distance between the earth and the base of a cloud that covers more than 4/10 of the sky

ceiling balloon (aer-met) A small free balloon, whose rate of ascent is known, used to determine the ceiling

ceiling height indicator (aer) A device that measures the height from the horizontal to the illuminated spot produced by a ceiling projector as seen from a fixed position

ceiling light (aer) same as ceiling projector

ceiling projector (aer) A device designed to produce a well-defined illuminated spot on the lower portion of a cloud for the purpose of providing a reference mark for the determination of the height of that part of the cloud

celestial navigation (air nav). The method of determining the geographical position of an aircraft by observation of celestial objects

cellophane The trade name for an elastic, transparent, heat resistant, airtight cellulose film. It is claimed to be no more inflammable than ordinary newsprint Used as a substitute for celluloid gutta percha, and parchment. Also used for packaging and wrapping perishable items.

cellular matrix (print) A feature of the Monotype casting machine The matrix for each character of the font is a separate piece of metal which is held with its mates, in line by a steel bar, called a matrix comb, fitted across the inside of a steel frame called a matrix case The matrices, like cells, are held in line by means of a comb-like series of projections or spurs on the steel bars which fit into slots in the sides of each matrix and keep it in place.

cellule (aer) In an airplane, the entire structure of the wings and wing trussing of the whole airplane on one side of the fuselage, or between fuselages or nacelles where there are more than one Also called "cell."

celluloid. Trade name for a material consisting essentially of a solid solution of cellulose nitrate and a plasticizer It may or may not be colored It is a synthetic nitrocellulose plastic

cellulose (chem) It forms the cell walls and fibrous structure of many plants, and is the chief constituent of paper and wood. It is insoluble in water and organic solvents but dissolves in ammoniacal copper solutions forming complex ions from which it may be regenerated by means of acid, it dissolves also in a mixture of alkali and carbon disulfide forming xanthogenates from which it is regenerated by the addition of acid to give various materials such as rayon and cellophane Cellulose esters and ethers are widely used in plastics lacquers and explosives and as artificial silk, also as nitrocellulose gun cotton celluloid

cellulose (paper) The fibrous substance obtained from cotton linen, hemp, wood and many other plants by treating them in such a manner as to dissolve and extract the resinous and non fibrous material Cellulose fiber is the basis of all paper, the quality of the paper depending upon the proportions and quality of the cellulose Clean new cotton contains the greatest amount of cellulose of any of the materials used for paper making It is represented as containing 90% cellulose the rest being water fat ashes, etc

cellulose acetate (chem) A non-inflammable, yellowish mass which is transparent Used for insulation of telephone wires, artificial silk, airplane dope photographic films plastics, and rubber substitutes See also acetate rayon

Celsius The inventor of the centigrade temperature scale Used only rarely in the United States as the name of this scale It is more common in Europe.

cementation process (metal) The carburization of metal while in the molten state and with the exclusion of air Used to harden steel for special uses such as for cutting tools, armor plate, or for metal parts or surfaces that are subjected to great wear Casehardening is a form of the cementation process

cementite (metal) A carbide of iron (Fe_3C)

center hung sash (carp) A sash hung on its centers so that it swings on a horizontal axis

center line (ship) The fore and aft line at the middle of the ship

center line bulkhead (ship) A bulkhead running from the forepeak or collision bulkhead to the afterpeak bulkhead, except in the engine space The neutral

center of the center line bulkhead is on the center line of the ship

center of buoyancy (aerostat) The center of gravity of the air displaced by a balloon or airship It is approximately the center of gravity of the contained gas.

center of buoyancy (seaplane) The center of gravity of the fluid displaced.

center of gravity (aut) That point of the vehicle about which all parts are balanced With reference to vertical dimensions, there is an imaginary point within the length and width of a vehicle, where all weights balance, known as the vehicle's center of gravity

center-of-pressure coefficient (aer) The ratio of the distance of the center of pressure from the leading edge to the chord length.

center of pressure of an airfoil (aer) The point in the chord of an airfold, prolonged if necessary, which is at the intersection of the chord and the line of action of the resultant air force

center punch (mach) The center punch is a steel rod, usually knurled, with one end tapered to a 60 degree tempered point. It is used to dent work prior to drilling for the purpose of guiding the point of the drill.

center section (aer) The central panel of a wing, in the case of a continuous wing or any wing having no central panel, the limits of the center section are arbitrarily defined by the location of points of attachment to the cabane struts or fuselage

centigrade. A temperature scale according to which the freezing and boiling points of water are marked zero degrees and 100 degrees respectively To convert centigrade into Fahrenheit, multiply by 9, divide by 5, and add 32.

centigrade heat unit (C.h.u) The amount of heat necessary to raise one pound of water to one degree centigrade

centigram. One hundredth of a gram.

centimeter. One hundredth of a meter

central office (tp) An office in a telephone system providing service to the general public where orders for or signals controlling telephone connections are received and connections established. The term "central office" as applied to either manual or dial equipment used in switching subscriber lines includes any unit of equipment having a separate office name or code and in addition having independent incoming trunks and switching equipment for switching subscriber lines A central office may serve some subscribers on a theoretical office basis with additional names or codes In this case for special reasons some separate incoming trunk groups may be provided for the traffic to the theoretical offices There may be one or more central offices in a central office building

centrifugal casting (metal) A process of metal casting wherein the mold is revolved while the poured metal is still in a molten state The centrifugal action tends to drive out gas bubbles thus producing a sound casting

centrifugal force (phy) 1 The force which a mass, constrained to move in a circular path, exerts on the constraint in a direction along the radius 2. In mechanics, the fictitious force which must be introduced as acting along a radius on a mass moving in a circle in order to reduce the problem to one in statics The force operating in the opposite direction is called "centripetal force"

centrifugal starting switch (el) A centrifugally operated automatic mechanism usually used in connection with split-phase induction motors to open or disconnect the starting winding after the rotor has attained a predetermined speed, and to close or reconnect it prior to the time the rotor comes to rest

centrifugal type supercharger (aer) A high-speed rotary blower equipped with one or more multiblade impellers which, through centrifugal action, compress the air or mixture in the induction system

centrifuge (chem) An instrument for separating liquids of different specific gravities by the use of centrifugal force.

centripetal force (phy) The force which restrains a body in rotation from going in a straight line It is directed toward the center of rotation. A force equal, but opposite in sign, to the centrifugal force

ceresin. A substitute for beeswax, prepared by heating ozokerite with sulphuric acid, with constant stirring, and decolorizing with charcoal, the product is then treated with volatile solvents to extract the contained ceresin.

cetane rating (aut) A system of numbers for indicating the ignition quality of Diesel fuels

CGS system of units An absolute system for measuring physical quantities in which the fundamental units are the centimeter, gram and second This system is primarily applicable only to mechanical units It is extended to other fields of physical science by accepting the doctrine of the conservation of energy and by introducing a fourth unit or a property of a material For example, in the theory of heat, the degree centigrade is taken as an additional unit.

chain (survey) See surveyor's chain.

chain intermittent fillet welds Two lines of intermittent fillet welding in a tee or lap joint, in which the increments of welding in one line are approximately opposite to those in the other line

chain locker (ship) The compartment, near and below the hawse holes at the bow, for stowing the anchor chains

chain pipe (ship) A pipe of large diameter, through which the chains pass into the chain lockers

chain plate (ship) A metal plate with an eye in the upper end, fitted at the deck edge or gunwale to take the shrouds or shroud whips, also used for steadying lines during lifting

chain tongs. A pipe-fitter's tool, a lever with a serrated end provided with a chain to enlace the pipe. The chain is wrapped around the pipe to hold the lever in place, and the teeth on the end of the latter grip into the pipe, thus affording a powerful leverage to screw or unscrew the joints

chalcopyrite (chem) See copper pyrites

chalk line (ship) A small line, strong enough to withstand being drawn very taut over a surface The line is first chalked, then drawn taut between two points and "snapped," thus leaving an impression of the chalk on the surface to be marked

chalky (phot) A term applied to prints showing excessive contrasts

chamfer (carp) A beveled surface cut upon the corner of a piece of wood.

chandelle (aer) An abrupt climbing turn to approximately a stall in which the momentum of the airplane is used to obtain a higher rate of climb than would be possible in unaccelerated flight. The purpose of this maneuver is to gain altitude at the same moment that the direction of flight is changed

changeover switch (el) A switching device for changing electric current from one combination to another It is usual to qualify the term "changeover switch" by stating the purpose for which it is used, such as a series parallel changeover switch, trolley shoe changeover switch, etc.

channel patch (aer) A channel-shaped fabric fitting secured to the envelope of an aerostat to allow a rod or spar to be laced to the envelope.

characteristic (math) The characteristic of the logarithm of a number is the integral part of the logarithm E g, since log 100 is 2 and log 1000 is 3, the logarithm of any number between 100 and 1000 is 2 plus some decimal, 2, then, is the "characteristic" of all numbers less than 1000 and equal to or greater than 100

charcoal (print) A black, porous, carbonized material made by imperfectly burning some vegetable or animal substance, like wood, bone, ivory, etc. It is used for a great variety of purposes. Among

engravers and artists it is used for polishing copper and zinc plates, and in the form of pencils made of charcoal dust, or in pencil-like sticks, it is employed for drawing, illustrative purposes, etc. Charcoal black is a writing or coloring pigment made of any calcined animal or vegetable substance.

charcoal drawing (art) A freehand drawing or design, made with charcoal sticks or pencils, usually on special paper

charcoal paper (paper) A soft, rough-finished paper used for making illustrations with a charcoal crayon or pencil.

charge (el) Charge, applied to a storage battery, is the conversion of electric energy into chemical energy within the cell or battery Specifically, charge consists in the restoration of the active materials by passing a undirectional current through the cell or battery in the opposite direction to that of the discharge, a cell or battery which is said to be "charged" is understood to be fully charged

charge (metal) Charge comprizes the collective materials which a furnace receives for treatment or conversion.

charging (metal) The act of supplying to a furnace the materials to be treated or converted.

Charles' law (chem-phy) The volume of a given mass of a gas at constant pressure is increased by 1/273 of its volume at o° C for each degree, rise in temperature. Also known as Gay-Lussac's law

chase (print) The iron frame in which a form is imposed and locked up for the press, made in many styles for various uses

chassis (aut) The automobile without the body The chassis is generally divided into the chassis frame with running gear and springs, the power unit, the transmission system, the steering and brake systems, and the accessories.

check line (ship) Used in shaping plates, etc., to make sure that the templates have not changed in size by shrinking, expanding, or warping

check rail (carp) See meeting rail.

checks (lumber) Splits in the outside part of a piece of timber which are caused by irregular shrinkage. Checks are formed when the circumference shrinks more than the interior section of the wood.

check valve (aut) A device that permits passage of a fluid or gas in one direction only It stops (or checks) flow if movement is reversed.

cheesecloth (text). Thin, loosely woven material made from coarse yarns When bleached, it is used and known as hospital gauze or surgeon's gauze

Cheltenham (print) The name given to a style of type face made by the American Type Founders Company, which has been a popular job and advertizing face. It is made in a "family" of several series, adapted to a wide variety of work, and probably will remain as a standard American type style

chemical dip brazing (weld) A dip brazing process wherein the filler metal is added to the joint before immersion in a bath of molten chemicals. See also brazing

chemigraphy (print) A name given to any process of mechanical engraving depending on the action of chemicals, a method of etching on metal in which photography is not employed.

Chemigum (chem) Trade name for a synthetic material said to be a butadiene polymer It is a synthetic rubber which has a high oil resistance, good flex life, and an abrasion resistance said to be slightly better than natural rubber It is claimed to be superior to natural rubber where oil and gasoline are factors It stiffens under the effect of heat. Used for tires, treads, gaskets, hose, belts, gas and oil tanks

chemitype (print) 1 A process for producing maps, etc., by etching lines in a zinc plate covered with wax, filling them with fusible metal, and then eating away the zinc with acid, leaving the lines in relief. 2. A plate made by this process.

cherry birch (lumber) Used in furniture making The bark yields a commercially valuable oil resembling oil of wintergreen.

chess (engr) The standardized floor planks of a floating military bridge

chestnut (*castanea dentata*) A light durable wood, valuable for timbers furniture, interior finish, railroad ties, fence posts, and telegraph poles Wt. 30 lbs per cu ft. (air-dried) Maximum crushing strength 6,620 lbs per sq in Shearing strength parallel to grain 1,160 lbs per sq in

chestnut oak (*quercus prinus*) A brown wood, used for railroad ties, fencing and fuel Wt. 46 lbs per cu ft. (air-dried) Maximum crushing strength 7,840 lbs per sq in Shearing strength parallel to grain 1,600 lbs per sq in

chilled casting (metal) An iron casting set in a metal mold and chilled by contact with the metal of the mold

chine (aer) The intersection of the bottom with the sides or deck of a seaplane float.

Chinese white (print). A pigment made of zinc oxide, used in printing ink.

chlorinated wool (text) Wool made non-shrinking by treatment with cold solutions of chlorine and hydrochloric acid Fibers harsh, stiff, and weakened Increased affinity for dyestuffs See also unshrinkable wool.

chock (ship) A metal casting used as a fair lead for a mooring line or anchor chain

chockablock (nav) Full, filled to the extreme limit.

chocks (ship) Deck fittings for mooring line to pass through

choke coil (el) A coil of low resistance and sufficient inductance to impede definitely alternating or transient currents as distinguished from direct currents or currents of normal frequency

choke coil (rad tp) An inductor inserted in a circuit to offer relatively large impedance to alternating current

chord (aer) An arbitrary datum line from which the ordinates and angles of an airfoil are measured. It is usually the straight line tangent to the lower surface at two points, the straight line joining the ends of the mean line or the straight line between the leading and trailing edges

chord (geom) A straight line joining the ends of an arc

chord direction (stress analysis) (aer) The direction parallel to the intersection of the plane of the internal wing truss with the plane of symmetry of the airplane When a wing has two internal trusses in nonparallel planes, the plane bisecting the dihedral angle between those two planes should be used (cf beam drag, lift and side directions)

chord force (stress analysis) (aer) A force, or component, in the chord direction, i.e., parallel to the intersection of the plane of the internal wing truss with the plane of symmetry of the airplane (cf beam, drag, lift, and side forces) Also called "chord component"

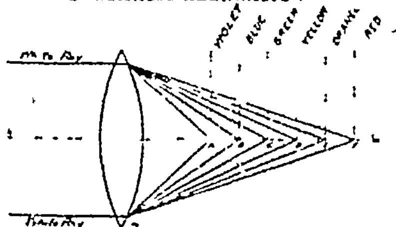
chord length (aer). The length of the projection of the airfoil profile on its chord

chord wire (aer) A wire joining the vertices of a main transverse frame

chroma (phy) Color intensity, the degree of departure from black or white In color pigments, chroma is the quality which distinguishes an intense color from one not so intense Bright red, vermilion, flaming scarlet, emerald green, and other light colors are examples of high chromas When used in reference to light chroma means the purity of one wavelength free from all others

chromatic aberration (phy) A lens defect

CHROMATIC ABERRATION



caused by failure of the colored rays of light to focus at the same point.

chrome (chem). See chromium.

chrome (print) A yellow pigment obtained from lead chromate, used in making printing inks

chrome tanning *The principal method of* leather tanning with a mineral agent. The processes used differ somewhat, but all employ one or more salts of chromium, principally chrome sulphate and bichromate of potash or soda

chromite (chem) A black mineral which is the principal source of chromium. Also called chrome iron ore

chromium (Cr) A steel-gray metal generally found as an oxide in combination with iron ore Used in the manufacture of chrome steel. At. wt. 52.01, at. no 24; m p 1615° C, sp gr 6.92.

chromogen (chem) Any chemical group which by itself or when associated with some other group imparts color

chromometer (chem) An apparatus used in quantitative analysis by the color method

chromophilic (chem) Easily stainable

chromophore (chem) A group which gives color to an organic compound but does not necessarily make it a dye.

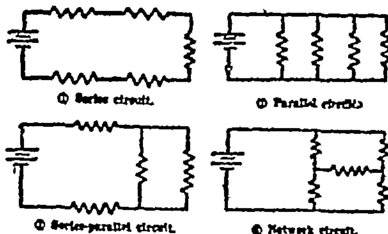
chromotropism (chem) Response to color stimulation

chuck (mach) A device for holding work or a tool in a machine, especially in a lathe.

circle marker (aer) A circular band marking the approximate center of the landing area or the intersection of the principal landing strips on an airport or landing field.

circuit (el) A conducting part or a system of conducting parts through which an electric current is intended to flow

TYPES OF CIRCUITS



circuit breaker (el) A device for interrupting a circuit between separable contacts under normal or abnormal conditions. Ordinarily circuit breakers are required to operate only infrequently, although some classes of breakers are *suitable for frequent operation.* "Normal" indicates the interruption of currents not in excess of the rated continuous current of the circuit breaker "Abnormal" indicates the interruption of currents in excess of such rated continuous current such as short-circuits In application, circuit breakers are selected whose rated interrupting current is as great or greater than the maximum current which they may be called upon to interrupt.

circular knit (text) A fabric made on a circular, or flat, knitting machine in a tubular form.

circular measure:
60 seconds = 1 minute
60 minutes = 1 degree.
30 degrees = 1 sign.
90 degrees = 1 quadrant.
4 quadrants = 12 signs = 360 degrees = 1 circle

circulating pump (aut) A pump which keeps the coolant or cooling water in constant circulation. It is operated by the cam gear and is connected to the water jacket.

clamp (carp) A mechanical device used to hold two or more pieces together See also clamps.

clamp (ship) A main longitudinal strengthening member under the deck in decked-over boats and at the gunwale in open boats

clamping screw (el) See binding screw

clamps (tool) Tools used for holding work outside of a vise, particularly where no vise is available Generally they are used only for light work, although heavy clamps are manufactured There are C-clamps, band screw clamps, and toolmaker's clamps.

clapboards (carp) A special form of outside covering of a house, siding

Clarendon (print) A style of type in which all the lines are thickened, somewhat heavier and more condensed than antique, with thick serifs Largely used for heading and advertisements in newspapers.

Class A amplifier (rad) A class A amplifier is an amplifier in which the grid bias and alternating grid voltages are such that plate current in a specific tube flows at all times

Class AB amplifier (rad) A class AB amplifier is an amplifier in which the grid bias and alternating grid voltages are such that plate current in a specific tube flows for appreciably more than half but less than the entire electrical cycle

Class B amplifier (rad) A class B amplifier is an amplifier in which the grid bias is approximately equal to the cut-off value so that the plate current is approximately zero when no exciting grid voltage is applied, and so that plate current in a specific tube flows for approximately one-half of each cycle when an alternating grid voltage is applied.

Class C amplifier (rad) A class C amplifier is an amplifier in which the grid bias is appreciably greater than the cut-off value so that the plate current in each tube is zero when no alternating grid voltage is applied, and so that plate current flows in a specific tube for appreciably less than one-half of each cycle when an alternating grid voltage is applied.

Note—To denote that grid current does not flow during any part of the input cycle, the suffix 1 may be added to the letter or letters of the class identification The suffix 2 may be used to denote that grid current flows during some part of the cycle

classes of insulation (el) See insulation.

claw hammer (carp). A steel-headed, wooden handled, nail-driving tool It gets its name from the fact that one part of the hammerhead is formed like a two-pronged, arched claw which is used to pull nails out of wood The main parts of the steel head are the eye, claws, and face The face may be flat or slightly convex; the former is called a plane face hammer, the latter a bell-faced hammer The most common sizes of claw hammers are No 1, weighing 20 ounces, No 2, weighing 16 ounces, and No 3, weighing 12 ounces

clearance (aut) The space between a moving and a stationary part usually allowed to provide for expansion and contraction and for lubrication.

clearance (mach) The space between the crest of a thread and the root of its mating thread.

clearance volume (compression volume). (aut) The amount of space confined within the engine cylinder and cylinder head when the piston is at its top dead center position.

clearing circuit (RR). A term applied to a circuit used in connection with the operation of a signal in advance of an approaching train

cleat (el) An assembly of two pieces of insulating material provided with grooves for holding one or more conductors at a definite spacing from the surface wired over and from each other, and with screw holes for fastening in position.

cleat (ship) A horned casting for belaying lines. Any device with two arms from which a line may be belayed. It can be made either of wood or metal.

clevis. A fitting having a U-shaped end and arranged for attaching to the end of a pipe or rod.

clew (of a sail) The lower after corner of a fore and aft sail.

climbing shaft (aer) A shaft, fitted with a ladder, which leads from the bottom to the top of an airship hull to provide access to the upper portion.

clinometer An instrument for measuring the angles of dip of surface structures An instrument used to measure vertical angles, such as the dip of strata or the slope of the ground.

clip (ship) Short length of bar, generally an angle, used to attach shapes to the ship structure

clipping (text) Cutting the long fibers on the surface of the cloth to make them equal length. A process used particularly on pile fabrics

clockwise. In the same direction of rotation as that in which the hands of a clock move around the dial.

closed-circuit voltage (el) (working voltage) The voltage at the terminals when a specified current is flowing through an external circuit. For storage batteries, this applies to either charge or discharge.

closed electric circuit (el) A continuous path in the form of a loop or a group of interconnected loops in which each loop is capable of carrying an electric current.

close-hauled (by the wind or on the wind) Sailing a boat as close to the direction from which the wind blows as will gain the most distance to windward in a given time.

cloth beam (text) A beam on which the material is wound as it is woven. It is situated at the front of the loom.

clutch (aut) A mechanism for connecting and disconnecting the engine and the transmission. When the clutch is "engaged" or "thrown in," the engine is connected to the transmission gears and turns the drive wheels, when the clutch is "disengaged" or "thrown out," the engine is said to be "running free."

c.m (abbr) Circular mil, the area of a circle with a diameter of one mil (0 001 in.), used as a unit in the Edison Wire Gage for round copper wires.

coal gas. A gas obtained from the distillation of soft coal and used for illuminating purposes It consists mainly of hydrogen, methane, and carbon monoxide

coal tar (chem) A thick viscous substance resulting from the distillation of coal. The basis of thousands of carbon compounds known as coal tar products Examples dyes, explosives, medicines, roofing and paving compounds, food preservatives, etc.

coaming (ship) 1 A frame bounding a hatch for the purpose of stiffening the edges of the opening and forming the support for the cover It also prevents any water on deck from washing down to the deck below through the companionway 2 Plates, heavier than bulkhead plates, at the top and bottom of a deck house, bulkheads, and division bulkheads between decks, for the purpose of stiffening and adjusting height to suit the shape of the ship

coarse cut. Coarsest of all cuts made with a file To be distinguished from bastard cut and second cut.

coaster (nav) A vessel engaged only in running up and down the coast.

coated paper (paper) Paper which has a surface coating, giving it a smooth and usually glossy finish Coating is made of fine china clay, obtained from a soft rock ground to a fine powder This is mixed with a thin glue-like liquid and applied to the surface of the paper When the coating is dry, the paper is passed through a series of heated friction rollers under great pressure, which gives the gloss The coating may be on one side only, or on both sides of the paper Its smooth and delicate surface is well adapted to receive the minute

dots and lines of halftones and other fine engravings. Also called "enamel paper"

cobalt (Co) A hard white metal with a bluish tinge Generally occurs in a combined state with nickel or copper Used in the manufacture of cobalt steel, a corrosion resistant steel At. wt. 58.94, at. no 27, m p 1490° C.

cockbill (nav) A yard is cockbilled when one yardarm is cocked up above the other, and anchor, when hanging by ring stopper up and down.

cockpit (aer). An open space in an airplane for the accommodation of pilots or passengers. When completely enclosed, such a space is called a cabin.

cockpit (ship) A compartment, usually for passengers, in an open boat.

cockpit cowling (aer) A metal or ply wood cowling placed around a cockpit.

code beacon (aer) A flashing beacon light having a recognizable characteristic of dots and/or dashes by which its individual identity can be established.

coefficient (math) A ratio, a known factor or quantity that is a constant.

coefficient of expansion (phy) The degree of expansion of a body expressed as a proportion of its length at a standard temperature, usually o° C or 32 F

cofferdam (ship). A void or empty space separating two or more compartments for the purpose of insulation, or to prevent the liquid contents of one compartment from entering another in case of a leak.

coil (el) A compact assemblage of successive convolutions of a conductor

coil antenna (rad) See loop antenna

coke. The gray, porous substance remaining after the distillation of coal Used as a fuel and in the manufacture of iron and steel.

cold chisel (tool). A tool used for chipping or cutting cold metal by hand before its surface has been filed to a fit. It is made of a good grade of tool steel, hardened at the point, sharpened to a cutting edge at one end, and, in hand work, driven by a hammer It will cut any metal softer than it is, in general, any material that can be cut with a file Cold chisels are classified according to the shape of their points, the commonest shapes being flat, cape, round nose, and diamondpoint.

cold front (met). A narrow zone in which a cold air mass is displacing a warm air mass

cold region (met) That portion of a cyclonic wind system occupied by the cold air mass.

cold sector (met) See cold region.

cold short (metal) Said of metal which is brittle in the cold state.

cold wave (met) A rapid drop in temperature due to the southward movement of a very cold polar or arctic air mass.

collar (ship). An angle ring used around a pipe or mast, or a flat plate made to fit around a girder or beam passing through a bulkhead or deck. It serves to make various spaces watertight, oiltight, weathertight, or dust-tight.

collar (weld) The reinforcing metal of a non-pressure thermit weld

collar beam (carp) See tie beam

collector rings (el) Metal rings suitably mounted on an electric machine, serving through stationary brushes bearing thereon, to conduct current into or out of the rotating member Also called slip rings

collision bulkhead (ship) A watertight bulkhead at the forepeak extending to main deck. This bulkhead prevents the entire ship from being flooded in case of a collision.

collodion (chem) A solution of cellulose in alcohol ether The gel resulting from the evaporation of the solvent is used as a semi-permeable membrane for diffusion, and as an ultrafilter

colloid (chem) A dispersion of one phase of matter in another, where the particles of the dispersed phase are coarser than molecular The range of size of colloid particles is arbitrarily fixed between 1 micron and 0 1 micron

colloidal particles (chem) Electrically charged particles, suspended in a medium, that are larger than atomic or molecular dimensions, but sufficiently small to exhibit the Brownian movement.

colophon (print) A note of information about the making of a manuscript or book, giving an account of the work, place of copying, copyist, etc. The term is also used to include the printer's emblem, trade-mark, or other imprint placed on his work. The practice of making colophons was followed by the early typographers and these features are sources of much information about early printed books

colorimeter (phy) An optical instrument, used in colorimetric analysis to accurately measure color differences

colorimetrics (chem) A method of detection or determination based on a difference, qualitative or quantitative, of color

color pyrometer (foundry) An apparatus based on the principle of the photometer and used to measure the temperature of molten steel. The colors radiated from the molten steel are matched against a color scale calibrated in temperatures

column (bldg) A support, square, rectangular, or cylindrical in section, for roofs, ceilings, etc., composed of a base, shaft, and capital.

column (ship) A pillar or stanchion.

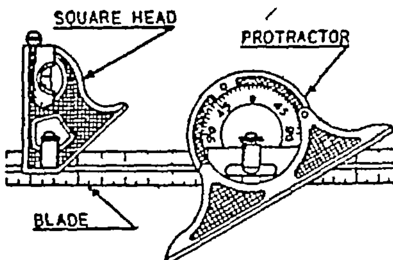
coma (phy) The spherical aberration of rays of light which pass through a lens in an oblique direction. It is present in a lens when the image of a bright point of light toward the margin of the field of view is distorted into a pear shaped or coma-shaped blur Sometimes known as oblique spherical aberration or zonal aberration

comb board (carp) See saddle board.

combination frame (carp) A combination of the principal features of the full and balloon frames

combination set (mach) A type of square equipped with a protractor head and a center head, as well as the stock 90-degree and 45-degree head. These accessories are readily removable, so that the one needed can be quickly attached to the blade. The protractor head is used for measuring angles other than 45 degrees or 90 degrees

combination try square (carp) A try square that has removable and adjustable heads, the most common of which is the stock head.



Three Piece Combination Square

combing (text) 1 Wool that is strong and strictly of combing length, that is, two or more inches in length 2 A process used in cotton and wool to parallel fibers and separate the short fibers from the long fibers

combustion chamber (aut) The space within the cylinder in which the fuel mixture is burned, all the space between the top of the piston at top dead center and the head of the cylinder

combustion control (el) The regulation of the rate of combination of fuel with air in a furnace

commercial weight (text) The oven-dry (bone dry) weight of a textile material plus the weight corresponding to its commercial moisture regain.

common battery telephone set. A telephone set for which both the telephone transmitter and the signaling currents are supplied from a central office, private branch exchange or other centralized power source.

common factor (alg). A quantity which is a divisor of two or more numbers Example in the expression 5x—15x, x is the common factor

common logarithms (math) Logarithms having the base 10 Also called "Brigg's logarithms"

common multiple (math) A common multiple of two or more numbers is a multiple of each of them, i.e., it can be divided by each of them Example 24 is a common multiple of 2, 3, 8, and 12.

common rafters (carp) Rafters which run square with the plate and extend to the ridge

common return (el) A return conductor common to several circuits

common rot (lumber) A decay in timber manifested by the presence of external yellow spots on the ends of the timber, or by a yellowish dust in the checks and cracks, especially where the pieces are in contact with one another, Caused by improper ventilation of wood storage sheds and lumber piles

commutator (el) A cylindrical ring or disk assembly of conducting members, individually insulated in a supporting structure with an exposed surface for contact with current-collecting brushes and ready for mounting on an armature shaft, quill or spider The end opposite to the armature core is known as the front end.

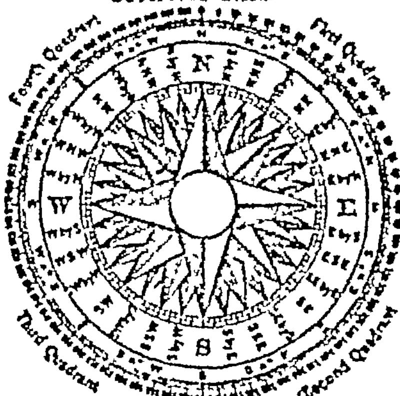
commutator bars (el) The metal current-carrying members of a commutator which make contact with the brushes. Also called commutator segments.

commutator segments (el) See commutator bars.

companionway (ship) A set of steps or ladder leading up to deck from below

compass 1. An instrument for describing circles or for measuring distances between two points. Usually used in the plural, as compasses Sometimes called dividers 2. A mariner's compass consisting of a magnetic needle which rotates about an axis perpendicular to a compass card on which the directions are indicated. The needle always indicates the direction of the magnetic meridian

COMPASS CARD



compass (air nav) An instrument indicating the angle of the longitudinal axis of the aircraft with respect to the axis of the compass needle Taken to be a magnetic compass unless otherwise designated.

compass bearing (air nav) The magnetic bearing with deviation applied.

compass compensation (air nav) A practical method of applying magnets or other correctors to neutralize the magnetic forces exerted on the compass by the aircraft structure and equipment.

compass course (C.C) (air nav). The magnetic course with deviation applied.

compass error (C.E). (air nav). The algebraic sum of the variation and deviation.

compass heading (air nav) Magnetic heading with deviation applied.

compass rose (air nav) A small circle, graduated in degrees (0 to 360), placed on maps or charts as a reference to directions true or magnetic. Also used to designate the graduated circle used as a base for ground compass swinging

compass saw (carp) Also called keyhole saw Used to cut along curved lines and to start cuts for larger saws It has a blade of thin, high-grade steel, shaped like an elongated V The teeth of the blade are shaped and sharpened to combine the qualities of the crosscut saw and ripsaw The groove cut is wider than that of the crosscut saw and ripsaw in order to allow more freedom for the blade to turn when cutting curves The handle is a modified pistol-grip type

compass swinging (air-nav) The process of determining the deviation of the magnetic compass

complex brasses (metal) The complex brasses are alloys of copper and zinc with one or more other metals, principally aluminum, iron, lead, manganese, magnesium, phosphorus, and tin

composited circuit (tg-tp) A circuit which can be used simultaneously for telephony and direct-current telegraphy or signaling, separation between the two being accomplished by frequency discrimination

complimentary colors (phy) Those pairs of colors which, when mixed, produce white or gray light red and blue-green, green-yellow and violet, yellow and indigo-blue In pigments, those opposite colors which, when mixed, produce a neutral gray, thus blue is complementary to yellow-red, yellow is the complement of purple-blue; red is the complement of blue-green.

composing room (print) That part of a printing establishment in which type is set, proved, imposed, locked up, and made ready for the printing press

composing rule (print) A piece of steel or brass used in a composing stick, against which the types are placed in setting, it usually has a nib on one end, to remove it from behind the line after the justification is completed.

composing stick (print) The oblong tool which the compositor holds to place the types in as he takes them from the case.

composite electrode (weld) An electrode with or without a flux, having more than one filler material combined mechanically.

composite joint (weld) A joint wherein welding is used in conjunction with a mechanical joint.

composition (phot) The arrangement or grouping of objects within the picture area to make a pleasing, harmonious general effect.

composition (print) 1. That part of the work of printing which pertains to typesetting, making up, etc. Arranging the pages in a chase and locking up for the press is "imposition" 2. The term composition is also applied to a mixture of glue, syrup, etc., used in making ink rollers.

compositor (print) One who sets type, according to the class of work done, he is termed a book, newspaper, ad, or job compositor

compound (chem) The combined form of two or more elements.

compound microscope (opt) One which has two lenses or two sets of lenses (1) the eyepiece or eyepiece assembly and (2) the objective or objective assembly

compound-wound motor (el) A direct-current motor which has two separate field windings—one, usually the predominating field, connected in parallel with the armature circuit, and the other connected in series with the armature circuit.

compression-ignition engine (aer) A type of engine in which the fuel is sprayed into the cylinder and ignited by the heat of compression of the air charge See also Diesel engine.

compression pressure (aut) The amount of pressure resulting from the compression stroke of a piston when it has reached top dead center

compression ratio (aer). The ratio of the volume of the gas in an engine cylinder at the beginning of the compression stroke to its volume at the end of the stroke

compression ratio (aut) A ratio expressing the extent to which a fuel mixture or air charge is compressed. It is a relationship between clearance and displacement volumes and is found as follows

$$\frac{\text{piston displacement}+\text{clearance volume}}{\text{clearance volume}}=\text{compression ratio}$$

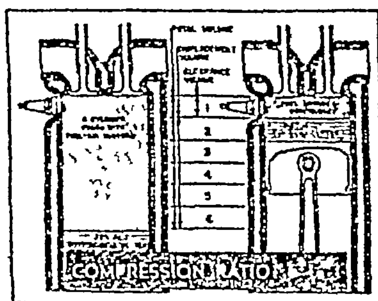
For example the compression ratio for a 3½ by 5-inch cylinder having a piston displacement of 48 105 cubic inches and a clearance volume of 12 026 cubic inches would be

$$\frac{48.105+12.026}{12.026}=5$$

This means that the original charge would be reduced or compressed to one-fifth of its original volume.

COMPRESSION RATIO
Displacement, Clearance & Total Volume

$$\text{compression ratio}=\frac{\text{displacement volume}+\text{clearance volume}}{\text{clearance volume}}$$



compression test (StM) A test used to determine the ductility of a metal. It is generally done by means of measuring devices such as the compressometer and the piezometer

compression wing rib (aer) A heavy rib designed to perform the function of an ordinary wing rib and also to act as a strut opposing the pull of the wires in the internal drag truss

compressive strength (StM) The compressive strength of a material is its resistance to a crushing force. Compressive strength of a material is measured in pounds per square inch

compressometer (StM). See proportional limit

compressor (refrigeration) A machine used in a compression refrigeration system to extract the cool low-pressure gas from the evaporator, to raise the gas pressure, and to discharge the high-pressure gas into the condenser

concave fillet weld. A fillet weld having a concave face

concave lens (phy) One thinner in the middle than at the margin and causing parallel light rays to diverge. Also called a diverging lens.

concentrated (phot) As applied to liquid preparations, this means that the chemicals which comprise them have been dissolved in the least possible quantity of water

concentration ring (aer) See airship concentration ring, free-balloon concentration ring

concentric. Having a common center.

concrete (bldg) A combination of sand, broken stone, or gravel, and cement used in foundations, building construction, for walks, etc.

concurrent heating (weld) Supplemental heat applied to a structure during the course of welding

condensation (met) A process in which water vapor changes to liquid water

condenser (el) See capacitor

condenser (phot) See condensing lens.

condenser (refrigeration). A machine that receives high pressure gas from the

compressor and extracts heat from the gas, reduces its temperature to its saturation point, and removes its latent heat of evaporation.

condenser antenna (rad) An antenna consisting of two conductors or systems of conductors, the essential characteristic of which is its capacitance.

condenser microphone (tp) A microphone whose electric output results from variation in electrostatic capacity.

condensing lens (phot). Used in enlargers and projectors for the purpose of evenly distributing the rays of the light source through the negative. Also known as condenser.

conductance (el) The property of an electric circuit, or of a body that may be used as a part of an electric circuit, which determines for a given electromotive force in the circuit or for a given potential difference between the terminals of a part of a circuit, the rate at which electric energy is converted into heat or radiant energy, and which has a value such that the product of the conductance and the square of the electromotive force, or potential difference, gives the rate of conversion of energy. In the general case, conductance is a function of the potential difference, but the term is most generally used in connection circuits where the conductance is independent of the potential difference.

conductivity (el) The conductivity of a material is the direct-current conductance between the opposite, parallel faces of a portion of the material having unit length and unit cross-section.

conductor (el) 1. A body so constructed from conducting material that it may be used as a carrier of electric current. 2. A wire or combination of wires not insulated from one another, suitable for carrying electric current.

conductor (for lightning protection) The portion of a protective system designed to carry the current of a lightning discharge from air terminal to ground.

conductors (bldg) Pipes for conducting water from a roof to the ground or to a receptacle or drain, downspout.

conduit (el) A structure containing one or more ducts Conduit may be designated as iron pipe conduit, tile conduit, etc. If it contains one duct only it is called "single-duct conduit", if it contains more than one duct it is called "multiple-duct conduit", usually with the number of ducts as a prefix, viz., two-duct multiple conduit.

conduit box (el). A metal box adapted for connection to conduit for the purpose of facilitating wiring, making connections, mounting devices, etc.

conduit run (el) See duct bank.

cone (aer) See axial cone, danger cone, entrance cone, exit cone, mooring cone, wind cone.

cone (weld) The conical part of a gas flame which is next to the orifice of the tip.

cone clutch (aut). A type of clutch in which a cone-shaped disk called the friction cone presses into a funnel-shaped driven disk. It is generally built into the flywheel of an engine.

cone pulley (mech) A number of graduated sizes of wheels with slightly convexed faces placed together, upon which a belt is run to transmit power from another pulley to the driving wheel of a machine. Used to vary the speed of the machine. A step-pulley.

configurated glass. Glass having a patterned or irregular surface. The surface configuration is usually applied during fabrication. Such glasses are not transparent and are somewhat diffusing Glasses falling under this classification are often referred to as pebbled, stippled, rippled, hammered, patterned, chipped, crackled, cathedral, etc., depending upon the particular type of surface

congruent (geom) Said of figures having the same shape and size so that they can be made to coincide

coning angle (aer) The average angle between the span axis of a blade or wing of a rotary wing system and a plane perpendicular to the axis of rotation

conjugate foci (phot) For every distance between object and lens on the one hand there is a corresponding distance between the lens and the image on the other hand. These two distances, the image distance and the object distance, are interdependent, i.e., as one increases the other decreases Also known as conjugate focal lengths

connecting rod (aut) A rod which transmits the crankshaft motion to the piston.

connection diagram (el) A diagram showing the relations and connections of devices and apparatus of a circuit or group of circuits

connector (el) A metal sleeve, usually copper, that is slipped over and secured to the butted ends of the conductors in making up a joint Also called splicing sleeve.

conning (nav) Directing the helmsman in steering a vessel.

constant (math phy) A property or quality that remains the same under the same conditions

constant acceleration (phy) See uniform acceleration.

constant-mesh transmission (aut) A type of transmission in which all the countershaft gears and the transmission main drive gear are fixed to their shafts The low-and-reverse and second-and-high main shaft gears rotate on the main shaft All the main shaft and mating countershaft gears are constantly meshed. A speed change is made by sliding the driving member of a dog clutch along the splined main shaft until it meshes with a driven member integral with the required gear, causing it to rotate with the main shaft.

constant motion (phy) A state of motion that does not change either in direction or magnitude

constant-speed motor (el) One whose speed of normal operation is constant or practically constant. For example, a synchronous motor, an induction motor with small slip, or an ordinary direct-current shunt-wound motor

construction (math) 1 The process of drawing a figure that will satisfy certain given conditions E.g., construction of a line perpendicular to another line and proving that it meets these requirements 2. Construction in proving a theorem; drawing the figure indicated by the theorem and adding to the figure any additional parts that are needed in the proof. Such additional lines, points, etc., are usually called "construction lines," "construction points," etc.

contact clip (el) The clip which the switch blade enters or embraces.

contact file (el) A file for dressing "make-and break" points of electric circuits

contact light (aer) One of a series of marker lights, set substantially flush in the ground along a runway, for the purposes of indicating the location of the runway and assisting aircraft to land or take off. Also called runway light.

contact potential (el). When two dissimilar uncharged metals are placed in contact with each other, one becomes positively charged and the other negatively changed, and a difference of potential, depending on the nature of the metals, is set up between them Also called Volta effect.

contact print (phot) A print made by placing the paper in contact with the negative.

contacts (el). Conducting parts which co-act to complete or to interrupt a circuit.

continuous current (el) See direct current.

continuous fin and tube core (aut) A radiator consisting of an assembly of fluid tubes of any cross sectional form, the tubes being joined together by radiating fins or plates common to all tubes or groups of the tubes

continuously adjustable capacitor (el) An adjustable capacitor in which the capacitance can have every possible value within its range. Also called variable capacitor

continuously adjustable inductor (el) An adjustable inductor in which the inductance can have every possible value within its range Also called variable inductor

continuously adjustable resistor (el) An adjustable resistor in which the resistance can have every possible value within its range. Also called variable resistor

continuous process of distillation. A petroleum distillation process in which the crude oil flows slowly by gravitation through a series of stills or retorts each placed slightly lower than the preceding one. Each still has a carefully maintained temperature, and yields, therefore, continuously a product of given volatility

continuous weld. A weld which extends continuously for its entire length.

contour lines (surv) 1 Projections on a plane of all the sections of a surface by planes parallel to this given plane and equidistant apart. 2. Lines on a map which pass through points of equal elevation Useful in showing the rapidity of ascent of the surface, since the contours are thicker where the surface rises faster Sometimes called "level lines"

contraction (metal) The act of becoming smaller in size, usually, in metals, a result of cooling or a lowering of temperature

contrasty (phot) A term applied to prints, meaning hard, "chalky," with extremely black shadows and white highlights When applied to negatives, it means lacking in detail.

control battery (el) A battery used as a source of energy for the control of an electrically operated device

control cable (aer) The line of wire or stranded cable leading from the control levers to the control surfaces or interconnecting the control surfaces.

control column (aer). A lever having a rotatable wheel mounted at its upper end for operating the longitudinal and lateral control surfaces of an airplane. This type of control is called "wheel control."

control desk (el) See benchboard.

control electrode (el). An electrode on which a voltage is impressed to vary the current flowing between two or more other electrodes

control grid (rad) A grid, ordinarily placed between the cathode and anode, for use as a control electrode

control light (aer) See indicator light.

control line (aer) One of the lines leading from the control car or compartment to the various parts of an airship and operating (either through mechanisms or directly) the rudders, valves, etc., which control the speed, altitude, etc., of the airship

control stick (aer) The vertical lever by means of which the longitudinal and lateral control surfaces of an airplane are operated The elevator is operated by a fore-and-aft movement of the stick, the ailerons, by a side-to-side movement.

control surface (aer) A movable airfoil designed to be rotated or otherwise moved by the pilot in order to change the attitude of the aircraft.

controllability (aer). The quality of an aircraft that determines the ease of operating its controls and/or the effectiveness of displacement of the controls in producing changes in its attitude in flight.

controllable propeller (aer) A propeller whose blades are so mounted that the pitch may be changed while the propeller is rotating

controlled spin (aer) *See normal spin.*

controller (el) A magnet used in automatic regulation of the current to con-

trol the power or the speed of an electric motor, operated by a lever, push-button or similar device.

controls (aer) A general term applied to the means provided to enable the pilot to control the speed, direction of flight, attitude, power, etc., of an aircraft.

convection (phy) The transmission of heat by currents of the particles of a gas or liquid.

convergence (met) The flowing toward a point or a zone of two or more air currents.

converging lens (phy) See convex lens

converter Generally, in superheterodyne receivers. A converter is a vacuum-tube which performs simultaneously the functions of oscillation and mixing (first detection) in a radio receiver

convertible lens (phot) One in which the two component glasses (front and rear elements) can be used as separate lenses

convex fillet weld. A fillet weld having a convex face

convex lens (phy) One thicker in the middle than at the margin and causing parallel rays of light to converge or focus at a point. Also called converging lens

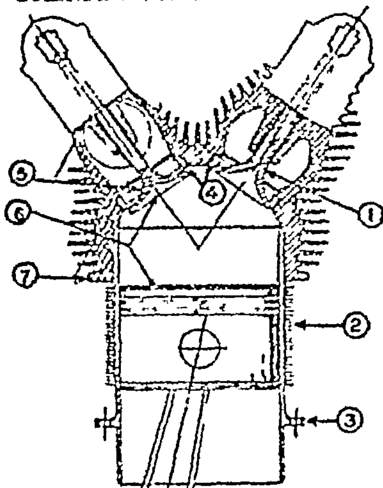
cooling fins (aer-aut) Thin flanges on the outer side of a cylinder in air-cooled engines

cooling system (aut) The particular group of units, that carries off and dissipates the unused heat generated in the engine.

cool time (weld) The period of time between the successive applications of current impulses in pulsation welding

co-ordinate (math) One of a set of numbers which locate a point in space If the point is known to be on a given line, only one co-ordinate is needed, if in a plane two are required, if in space, three

CYLINDER WITH COOLING FINS



co-ordinates (alg-nav-top). Both the abscissa and the ordinate from a given point on a graph to the vertical and horizontal axes respectively. The co-ordinates of a point are the perpendiculars to the X-axis and the Y-axis

copal (print). A resinous substance exuding from various tropical trees, used chiefly for making varnishes. In the manufacture of printing inks it is used as a vehicle.

copper (Cu) A reddish metal having malleability, ductility, tensile strength and excellent electric and heat conductivity At. wt. 63 57, at. no 29, m.p 1083° C, sp gr 8.95

copper (print) Largely used for printing, for making electrotypes, for copper-facing type, and for plates to be engraved or etched. Copper is also used in small quantities in the mixture of type metal, and in the composition of brass. Copper bronze powder is used for printing purposes

copperas (chem) A mineral, sometimes called melanterite. It is crystallized ferrous sulphate.

copper etching (art). A method of producing fine pictures similar to copper plate engraving, the plates being etched with acid instead of engraved with a tool. The entire plate is covered with a ground resembling varnish and the lines of the drawing scratched through the ground, after which the acid is poured on and the lines eaten or bitten down to varying depths and thicknesses 2. A line drawing reproduced on copper instead of zinc, for softer effect in direct printing is also termed a copper etching

copper-facing (print) A method of coating by electric action the face of new type, so that it will be more durable. The copper-facing of type is not common, and never was extensively practiced, as the replacement of worn-out type is now considered more practicable

copper pyrites (min) A sulphide of iron and copper, used as an ore of copper.

coppersmith. One who makes kettles, boilers, etc., out of copper

copy (print) The handwritten, typewritten, or printed words or design given to the printer Printed copy to be set again is termed reprint.

copying (phot) Making a photograph of another photograph, a drawing, map, or printed page.

cord. A stack of wood, with the sticks parallel each to each, 8 feet long, 4 feet high, and 4 feet wide.

cord (el) A small, very flexible insulated cable There is no sharp dividing line n respect to size between a cord and a cable

cord circuit (tp) A connecting circuit terminating in a plug at one or both ends and used at switchboard positions in establishing telephone connections.

cordate. Heart shaped.

cordovan (book) A fine-grained leather used for binding books. This kind of leather originally came from Cordova, Spain, but it is now generally made from horse-hides.

corduroy (text) A fabric usually of cotton with lengthwise rows or cords of pile on the face Found in white or any plain color Much used for suits and trousers for men, also for upholstery and hangings.

core (foundry). Generally a cylindrically shaped piece made of hard-baked sand or clay which is placed into the mold after the pattern has been removed. Its function is to form holes or deep recesses in the casting

core maker (foundry) One who makes cores for castings in a foundry

cores (print) 1. The hollow spaces in the bodies of large metal types and in metal bases of stereotypes and electrotypes 2 The center rods of composition inking rollers, also called roller stocks.

cork. Obtained from the bark of certain trees, principally the cork oak. It is light-colored, porous and has a specific gravity of only 0.24 Owing to the strong watertight walls of the cells the material is very elastic and when compressed exerts an increasingly great resistance. It is used for heat insulation, fuel valve seats, floats for certain gasoline gages, gaskets, and vibration insulators

corner joint (weld) A welded joint at the junction of two parts located approximately at right angles to each other in the form of an L.

corner quads (print) Cast in the shape of a right angle to match 6-point and 12-point quads They are useful to place outside the corners of a page with mitered rule joints to secure a true and even junction of the face

cornice (bldg) The molded projection which finishes the top of the wall of a building

cornice brake (sheet metal) The cornice brake is a bending machine used in sheet metal practice. It can form locks, double locks, and countersunk seams. It

can also form various shapes or bends, as for example, square, angular, quarter-round, round, and ogee bends.

corona (el) A luminous discharge due to ionization of the air surrounding a conductor around which exists a voltage gradient exceeding a certain critical value.

corona (met) A series of rings about the moon or sun partially obscured by clouds composed of water droplets

corrosion (metal) The slow combination and disintegration of a metal. Oxidation and rusting are examples of corrosion. Corrosion may be brought about by the action of the atmosphere, water, and chemicals Metals are generally painted, plated, or alloyed with other metals to resist corrosion.

corrosion test (metal) A test which speeds up the process of corrosion by employing acids, salt solutions, etc., to determine an "index of corrosion" based on loss of weight by a metal.

corrugated fastener (carp) One of the many means by which joints and splices are fastened in small timber and boards. Used particularly in the miter joint. It is made of sheet metal of 18 to 22 gage with alternate ridges and grooves The ridges vary from 3/16 to 5/16 inch, center to center One end is cut square, the other is sharpened with beveled edges

cotton felt (text). An undyed, cotton material, heavily napped on both sides, used for silence cloths under table cloths

cotton gabardine (text) A high warp textured cotton fabric of the same weave as wool gabardine.

cotton linters (paper) The short linters or lint which remain on the cottonseed after the cotton has been ginned, now removed and used as a raw material for paper manufacture.

cottonwood (populus deltoides) A tree of the poplar family, yielding a soft, light wood. Provides cheap lumber for shipping cases, boxes, and paper pulp Wt. 28 lbs per cu ft. (air-dried). Maximum crushing strength 7,230 lbs. per sq in Shearing strength parallel to grain 1,120 lbs per sq in

coulomb (el) The unit used for measuring the quantity of an electric charge. It is equal to the charge of 6.28×10^{18} electrons. A coulomb is one-tenth of an abcoulomb

coulometer (el) An electrolytic cell arranged for the measurement of a quantity of electricity by the chemical action produced. Also called voltameter.

count (text) 1. Fabric—The number (counted units) of warp yarns (end) and filling yarns (picks) per inch, as 68 by 62, meaning 68 warp ends and 62 picks in the filling 2. Yarn—A number given to yarn indicating fineness, based upon the number of yards per pound. More correctly called "yarn number"

counter (ship) The overhang of the stern aft of the stern post.

counter (ship) See overhang.

counterbalanced (aut) A term usually applied to a crankshaft having counterweights welded to it to prevent vibration at high speeds.

counterbore (tool). A tool fitted with a guide or pilot which fits into the hole and thus keeps the diameter of the enlarged section on the same center as that of the original hole. A fillister-head machine screw fits into a counterbored hole.

counterclockwise. In the direction of rotation opposite to that in which the hands of a clock move around the dial.

counterflashings (bldg). Strips of metal used to prevent water from entering the top edge of the vertical side of a roof flashing, they also allow expansion and contraction without danger of breaking the flashing

counterpoise (rad) A system of wires or other conductors, elevated above and insulated from the ground, forming the lower system of conductors of an antenna.

countershaft (aut) A short shaft mounted in the transmission case and having on it the countershaft speed gears

countershaft (mach) An intermediate revolving shaft connected by a belt to the main driving shaft and transmitting motion to a machine.

countersink (ship) A hole tapered so that a rivet, bolt, or screw head will come flush with the surface of the material.

countersink (tool) A tool having a pilot and used for the most accurate work. It makes countersunk holes, the enlarged portion of which are shaped like a section of a cone, and which are usually intended to bring flat head screws flush with the work.

countersink bit (carp) A bit with a rosehead point of conical flutes, a shank, and a tang It is used for enlarging and tapering the end of a hole This permits a screw head to be made flush or to be lowered below the surface of the material.

counterweight (aut) See counterbalanced.

coupe (aut) An enclosed single compartment body Passenger capacity varies with arrangement of seats or length of wheelbase. Two doors are provided, back panels and top are permanent, and the rear deck accommodates a luggage compartment. It may or may not be provided with quarter windows

coupler developer (color phot). One in which the oxidation product of the developing agent combines with a chemical agent in the solution to form an insoluble dye.

coupling (rad) The association of two circuits or systems in such a way that power may be transferred from one to the other

course (bldg) A layer or row of bricks.

course (C) (air nav) The direction over the surface of the earth, expressed as an angle, with respect to true north, that an aircraft is intended to be flown. It is the course laid out on the chart or map and is always the true course unless otherwise designated. All courses are measured from north through east to 360°

course light (aer) A light directed along the course of an airway so as to be chiefly visible from points on or near that airway

course made good (air nav) The resultant true direction the aircraft bears from the point of departure.

courses (knitted fabrics) (text) A series of adjoining loops from any one yarn lying crosswise of the fabric.

cove (aer) The line of intersection between two surfaces of a hull, the vertex of the angle of intersection pointing inward.

cover glass (weld) A clear glass used to protect the lens in goggles, face shields and helmets from spattering material

covered electrode (weld) (shielded arc) A metal electrode which has a relatively thick covering material serving the dual purpose of stabilizing the arc and improving the properties of the weld metal

covering power (phot) The limits within which a lens is capable of giving a well defined image.

cowhide. A coarse leather made from the skin of a cow, commonly known as "American Russia" or "imitation Russia." It has a slight grain, and is tough and strong

cowl (aut) The portion of the body or cab which surrounds the dash and forms a partial enclosure and supports the instrument board.

cowling (aer) A removable covering

cracking Chemical decomposition of oil while in a vapor condition by raising the temperature of the oil in the still above the normal point for the distillate being collected, and leaving the upper exterior surface of the still exposed to the atmosphere. Vapor condenses on the upper surface of the still and falls back into the fluid thereby reducing the hydrocarbons into products of lower den

sity and boiling point. The art of producing low-boiling point hydrocarbons suitable for motor fuel, in commercial quantities, from distillates or residue of high molecular weight. It originated about fifty years ago among stillmen in the old Pennsylvania refineries and means just what its connotation conveys, namely, a partial alteration, as distinguished from the more complete decomposition which would disrupt the molecule largely into carbon and permanent gas. Cracking simply alters the molecules to an extent that produces an amount of low-boiling fractions that cannot be obtained by simple distillation. It may not be accompanied by any considerable production of permanent gas, the product being largely a liquid condensate, but of different character from that obtained by simple distillation.

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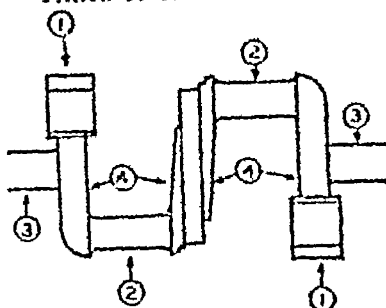
crane A machine for lifting or lowering a load and moving it horizontally, in which the hoisting mechanism is an integral part of the machine. It may be driven manually or by power and may be a fixed or a mobile machine.

crank arm (aut) The vertical member of a crankshaft, generally connecting the crankshaft journal or bearing with the "throw" or crank pin.

crank pin (aut) That part of the crankshaft to which the connecting rod is attached. It is also known as the "throw."

crankshaft (aut) A forged and machined durable steel alloy shaft (generally of nickel steel) with one or more cranks or "throws" along its length. It transforms the reciprocating power it receives from the piston and connecting rod into rotary power which it transmits to the flywheel or clutch.

PARTS OF A CRANKSHAFT



1 Counterweights 3 Crank journals
2. Crankpins 4 Crankarms

crash finish (paper) A finish on paper resembling a coarse linen fabric, applied by pressure.

crater (weld) A depression at the termination of an arc weld.

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creosote 1 An oily antiseptic fluid obtained by the distillation of wood tar. Also a similar substance obtained from coal tar. 2 To saturate or impregnate with creosote, as timber, to prevent decay.

crest (mach) The top surface joining the two sides of a thread.

crest value (el) The crest value of any quantity which varies with the time is the maximum value which the quantity attains during the time interval under consideration. The crest value of a periodic quantity is the maximum value which the quantity attains at any time during a period. Also called peak value.

cribbing (ship) Timbers used to support the bottom of a ship while it is under construction.

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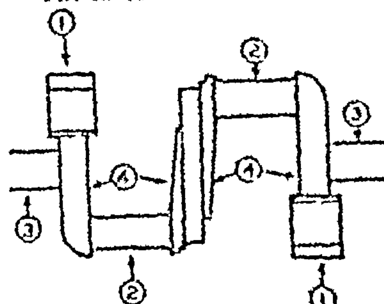
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cribble (art) To cover with small punctures or dots, as in engraving or decorating wood or metal.

cripple rafters (carp) Rafters which cut between valley and hip rafters

crith (chem) The weight of one liter of hydrogen 0 089873 of a gram.

critical altitude (aer) The maximum altitude at which a supercharger can maintain a pressure in the intake manifold of an engine equal to that existing during normal operation at rated power and speed at sea level

critical angle of attack (aer) The angle of attack at which the flow about an airfoil changes abruptly as shown by corresponding abrupt changes in the lift and drag

critical frequency (of a filter) (rad) A frequency at which, disregarding the effects of dissipation, the attenuation constant changes from zero to a positive value or vice versa.

crocking (text) The rubbing off of a color from a dyed material to a piece of unbleached cotton fabric.

Crookes tube (el) An early form of discharge tube devised by Sir William Crookes and used by him for the study of cathode rays The density of gas is roughly one-millionth that of the atmosphere

cropped (book) When a book is trimmed too much in binding, it is said to be cropped. When it is cut down so that the printing shows in the edges, it is said to "bleed."

cross (text). See lease.

cross arm (el) A horizontal member (usually wood or steel) attached to a pole, post or tower generally perpendicularly to the direction of the line, and normally used for the support of line insulators.

crosscut file. A file for sharpening crosscut saws

crosscut saw (carp) A saw used to cut across the grain, and to cut wet or soft wood. Its teeth are sharpened in such a manner that they act like small knife edges which cut the wood fibers When the saw is sharpened each tooth should be filed so as to conform as nearly as possible to the following specifications the cutting edge beveled 65 degrees from the line of teeth, the fore slope about 15 degrees from the vertical, and the back slope about 45 degrees from the vertical.

cross dyeing (text) The dyeing in one bath (or several baths) of two different fibers (as wool and cotton) whereby each takes on a different color, or one remains undyed

cross feed (mach) Also called "transverse feed" Horizontal feed in a direction across the width of the machine.

crossfire (tg) Interfering current in one telegraph or signaling channel resulting from telegraph or signaling currents in another channel.

cross-hatching (draw) Also called section lining Consists of uniformly spaced, 45-degree, fine, parallel lines, used to distinguish surfaces of material theoretically cut and exposed by the cutting plane. The spacing of cross-hatching varies from 1/32 to ⅛ inch, depending upon the size of the drawing and the part. Symbols are used to designate various materials in sectional view

cross-hatching (maps) In drawing and engraving, a shading made by parallel lines crossed over each other Used to indicate relief in the terrain

cross-hatch lines (draw) See section lines.

cross modulation (rad) A type of intermodulation due to modulation of the carrier of the desired signal in a radio apparatus by an undesired signal

cross peen (tool) The narrow, round-edged ridge of the striking face of a hammer head, at right angles to the axis of the handle

crosstalk (tp) The sound heard in a receiver associated with a given telephone channel resulting from telephone currents in another telephone channel. In practice, crosstalk may be measured

either by the loudness of the overheard sounds or by the magnitude of the coupling between the disturbed and the disturbing channels. In the latter case, to specify the loudness of the overheard sounds, the volume in the disturbing channel must also be given.

crosstree (ship) A structure on the mast built up of plates and angles for the purpose of holding the shroud pads.

cross-wind force (aer). The component perpendicular to the lift and to the drag of the total air force on a body

cross wires (surv) Filaments of platinum or spider web mounted on the face of a heavy brass ring which will always retain its shape. The vertical wire is fixed at right angles to the midde horizontal wire by the maker so as to divide the field of view into quadrants. These two wires are adjusted in the line of sight by means of four capstan head screws. Two fixed stadia wires, when required, are placed equally distant from the middle horizontal wire. The total distance between the stadia wires should be one-hundredth of the focal length of the objective. Their diameter should not cover more than two one-hundredths of a foot on a rod held at a distance of 1,000 feet.

crowbar A tool made of high-grade steel, about 5 feet long, and used to move heavy timbers and rocks. It operates on the lever principle.

crown glass (opt). See glass.

crow's-nest (ship). A platform and protective coaming setting on the crosstree on the foremast, to accommodate the look-out aloft while the ship is at sea.

crowsfoot (aer). 1. A system of diverging short ropes for distributing the pull of a single rope. 2. An arrangement in which the strands of a cord are opened out so that they can be effectively cemented to a fabric surface.

crucible (chem) A small porcelain vessel used in chemical experiments. (metal) A graphite or clay pot generally used in the manufacture of crucible steel

crucible furnace (metal). A type of furnace in which crucibles are heated in the manufacture of crucible steel.

crucible steel (metal) Steel produced by the "crucible process" In this process various grades of iron and steel are melted down in closed crucibles or in special crucible furnaces, generally with the addition of carbon, manganese, and other materials, depending on the product desired. The molten mixture is then cast in molds. Also called "cast steel."

cruciform girder (aer). The structure, consisting of vertical and horizontal transverse girders, fitted at the stern of a rigid airship for the purpose of supporting the inboard ends of the sternposts of the fins or of the rudder posts

crude metal (metal) Metal which contains impurities in sufficient quantity to make it unsuitable for specified purposes without refining

cryolite (min) A natural fluoride of sodium and aluminum mined only in Greenland. We are 100% dependent upon imports for this substance. Its usual color is snow-white to colorless The aluminum industry is the principal user of this material. It is a solvent for bauxite in the electrolytic process for the manufacture of aluminum The ceramic industry is also an important user of cryolite. It also serves as an opaque glass base which resembles porcelain. Artificial cryolite and synthetic resins are being used successfully to replace cryolite for its many uses.

cryoscopy (chem). Determination of the properties of substances by freezing points of mixtures.

crystal (chem-phy) A solid body having faces at definite angles to each other and a symmetrical atomic structure.

cup (can) (of a dry cell). The cup of a dry cell is a metal container, usually zinc, in which the cell is assembled and which constitutes also its negative element.

cupola furnace (metal) A shaft-type furnace similar to a kiln, used for melting

pig iron. The furnace is fired with coke. An air blast, either cold or preheated, is forced into the cupola through inlets similar to the tuyeres of a blast furnace.

cuprammonium rayon (text) Made from a regenerated cellulose which has been coagulated from a solution of cellulose in ammoniacal copper oxide

Curie point (el) See magnetic transition temperature.

current (el) The flow of electricity The gradual drift of free electrons along a conductor It is measured in amperes

current amplification (rad) The ratio of the alternating current produced in the output circuit of an amplifier, to the signal current supplied to the input circuit.

current density (el) Current density at a point is a vector having the same direction as the current and having a magnitude equal to the quotient of the current flowing through an infinitesimal area surrounding the point and perpendicular to the direction of the current divided by the area. In media which obey Ohm's law the current density is proportional to the gradient of the electric potential

curtain shutter (phot) See focal-plane shutter

curvature of field (phot) A defect in a lens showing sharper definition at the center of the plate than at the edges

curved cut. Said of file teeth which are made in curved contour across the file blank

curvilinear motion (phy) Motion along a curve, motion which is not in a straight line Curvilinear motion about a center of force is motion such as that of celestial bodies about the sun, the motion of a particle whose initial velocity was not directed toward the center of force and which is attracted by a force at the given center If this force is gravitation the path is a conic whose focus (or one of whose foci) is at the center of force

cut (of a file) The character of a file's teeth with respect to coarseness Cuts may be coarse, bastard, second cut, smooth, dead smooth. The character of a file's teeth with respect to type of file, i.e , single, double, rasp, curved, special.

cut (print) Printing shop term for a relief engraving of any kind, original or electrotype, also the printed impression thereof. The term is a survival of the time when all engravings used with type forms were woodcuts It is not properly applied to plates made by modern engraving methods

cut (text) 1. A unit of yarn number 2. The number of 100-yard lengths per pound avoirdupois of asbestos or glass yarn. 3 The number of 300-yard lengths per pound avoirdupois of woolen yarn 4 The number of needles per inch (in knitting)

cut flush (book) When the cover on a book, pamphlet or other work is trimmed with the inside at one cut so that the edges of the cover and inside sheets are even, it is said to be "cut flush."

cut-off frequency. See critical frequency

cut-off voltage (el) (final voltage) The prescribed voltage upon reaching which the charge is considered complete. The cut-off or final voltage is usually chosen so that the useful capacity of the battery is realized. The cut-off voltage varies with the type of battery, the rate of discharge, the temperature, and the kind of service in which the battery is used. The term "cut-off voltage" is applied more particularly to primary batteries, and "final voltage" to storage batteries

cut-out (aut) A device placed on the exhaust pipe between the exhaust manifold and the muffler, permitting the exhaust gases to pass directly into the air instead of through the muffler

cutout (el) An electric device to interrupt the flow of current through any particular apparatus or instrument, either automatically or by hand.

cutting attachment (weld) A device which is attached to a welding torch to convert it to a cutting torch

cutting down (metal). Cutting down of a metal or electrodeposit is polishing for the purpose of removing roughness or irregularities

cutting tip (weld) A gas torch tip especially adapted for cutting.

cutting torch (blowpipe) A device used in gas cutting for controlling the gases used for preheating and the oxygen for severing the metal.

cyanamide process (metal) A surface-hardening process for the production of tool steel. The steel is dipped into a molten bath containing calcium cyanamide. This is followed by a quenching treatment.

cyanotype (print) A print obtained by a photographic process, usually in blue or brown color, on a sensitized sheet of paper, used in copying line-drawings, maps, charts, etc. A blueprint.

cycle (el) The complete series of values of a periodic quantity which occur during a period.

cycle (mech). A series of events, operations, or movements that repeat themselves in an established sequence.

cyclogiro (aer) A type of rotor plane whose support in the air is normally derived from airfoils mechanically rotated about an axis perpendicular to the plane of symmetry of the aircraft, the angle of attack of the airfoils being always less than the angle at which the airfoils stall.

cycloid The plane locus of a point which is fixed on the circumference of a circle as the circle rolls upon a straight line

cyclone (met) A large portion of the atmosphere rotating counter clockwise about a center at which the atmospheric pressure is lower than over surrounding areas.

cyclotron (phy) A device which imparts the energy of millions of electron volts to positive ions which are then projected at great velocity against certain elements causing them to disintegrate. This process of "bombardment" and resulting disintegration of an element has given rise to the popular name of "atom smasher" for the cyclotron

cylinder (weld) A portable container used for storage of a compressed gas

cylinder in block (aut) A group of cylinders cast as one piece

cylinder machine (paper) A paper-making machine the wire of which is wound about a cylinder, as distinguished from the Fourdrinier, which has a flat wire

cylinder press (print) The style of printing machine which prints by means of a rolling impression against the type form or printing surface Those machines in which the printing forms are curved and fastened on the surface of a cylinder are termed rotary machines.

cylindroid. 1 A cylindrical surface whose sections perpendicular to the elements are ellipses 2 The surface which is the locus of a straight line moving so as to intersect two curves and remain always parallel to a given plane

D

Daguerreotype (phot) An early type of photographic plate *invented by* a Frenchman named Daguerre in 1839 It consisted of an iodized silver plate which was exposed and the image resulting was developed into a positive with mercury

Dalton's law (phy) The pressure of a mixture of several gases in a given space is equal to the sum of the partial pressures which each gas would exert if it were confined alone in the space.

dammar. A resin derived from various pineceous trees in Australia, New Zealand, and the East Indies It is used as a varnish and in the manufacture of printing inks

damped oscillation (el) The damped oscillation of a system is the oscillation when the amplitude of the oscillating quantity decreases with time If the rate of decrease can be expressed by means of a mathematical function, the name of the function may be used to describe the damping Thus if the rate of decrease is expressed as a negative exponential, the system is said to be an exponentially damped system Also called damped vibration.

damped waves (rad) Waves of which the amplitude of successive cycles, at the source, progressively diminishes

damper winding (el) See amortisseur winding

damping (el) The damping of the motion of a body or system (including electric charges) which has those characteristics necessary to develop oscillations or vibrations is the effect on the system of *those continuously applied agencies*, either external or internal, which hinder or prevent the execution of vibrations or oscillations

dandy roller (paper) A light skeleton drum with a surface of wire gauze, attached to paper-making machines The wet web of paper carried on the endless wire of the machine passes under this roller and is pressed by it The arrangement of the wires on the dandy determines the "wove" or the "laid" effect on the sheet. When letters, figures, or other devices are worked in fine wire on its surface, it produces the watermark.

danger cone (aer) A pennant or a hollow cone of light cloth on the wire cable of a captive balloon to warn aircraft of its presence.

dash (aut). (dash panel). The partition which separates the engine compartment from the driver's compartment.

dash panel (aut). See dash

dash pot (aut) A gasoline-filled chamber with a pump in it, located in a carburetor and supplying a very rich mixture to it for purposes of acceleration of the engine

dashpot (el) A device using a gas or liquid to absorb energy, or retard the movement, of the moving parts of a circuit breaker or other electric device

davits (ship) A set of cranes or radial arms on the gunwale of a ship, from which are suspended the lifeboats

D.C. (el) Direct current. Spelled d-c when used adjectively

"D" cable (el). A two-conductor cable each conductor having the shape of the capital letter "D" with insulation between the conductors themselves and between conductors and sheath.

dead (el) Dead means free from any electric connection to a source of potential difference and from electric charge; not to have a potential different from that of the earth. The term is used only with reference to current-carrying parts which are sometimes alive.

dead axle (aut) The rear axle on chain-drive trucks, so called because the axle itself does not revolve. The wheels are driven by sprocket and chain. Any axle carrying road wheels with no provision in the axle itself for driving the wheels

dead center (mach) A center which does not revolve. Either of the extreme top and bottom positions of a piston in a cylinder, called respectively top and bottom dead center

deadening (bldg). Construction intended to prevent the passage of sound.

dead flat (ship). The midship portion of a vessel throughout the length of which a constant shape of cross-section is maintained.

deadlights (ship) Heavy glass in port-holes, also heavy glass sometimes placed in decks.

deadman's feature (RR) That feature of a control system which acts to cause the current to the traction motors to be cut off, and/or the brakes to be applied if the operator becomes incapacitated.

deadman's handle (RR) A safety attachment to the handle of a controller, or to a brake valve, causing the current to the traction motors to be cut off, and/or the brakes to be applied, if the pressure of the operator's hand on the handle is released

dead matter (print). Type that has been printed and is ready for distributing. Type forms, after use, are "killed," that is, distributed, sometimes part is saved or "picked up"

dead reckoning (D.R.) (air nav) The method of determining the geographical position of an aircraft by applying the track and ground speed as estimated or calculated over a certain period of time from the point of departure or from the last known position. D.R. position is indicated by an X.

dead reckoning (nav) A reckoning kept so as to give the theoretical position of a ship without the aid of objects on land, sights, etc. It consists of plotting on a chart (map) the distance believed to have been covered along each course which has been steered. On a long voyage the navigator runs it from noon to noon.

dead rise (aer) In a cross section of a float or flying boat hull the amount by which the height of the chine differs from that of the keel.

dead rise (ship) The angle which the straight portion of the bottom floor of the midship section makes with the base line. It is expressed by the number of inches rise above the base line in the half-breadth of the vessel.

dead smooth cut. The finest of the standard cuts of regular files

dead water (nav) The eddy under a vessel's counter when she is in motion.

deadweight tonnage (ship) This states the carrying capacity of a ship, including cargo, bunker fuel, stores and voyage accessories, and represents the difference between the displacement of the ship when it is loaded and when it is light.

deadwood (ship) Timber built on top of the keel or shaft log at either end of the boat to afford a firm fastening for the frames and to connect the keel to the end timbers

de-aeration (chem) The removal by mechanical means of gases dissolved in a liquid

decagon (geom) A polygon having ten sides.

decalage (aer) The difference between the angular settings of the wings of a biplane or multiplane The decalage is measured by the acute angle between the chords in a plane parallel to the plane of symmetry The decalage is considered positive if the upper wing is set at the larger angle

decalcomania (ceramics) A process of transferring printed designs to glass, marble, etc. The decoration of glassware or porcelain by gumming pictures on it. It consists usually in simply gumming the paper or other film bearing the colored picture on to the object and then removing the paper with warm water, the colored picture remaining

decameter A unit of linear measure used in the metric system, equal to 10 meters or approximately 32.808 feet.

deceleration (phy) Negative acceleration The rate of decrease of speed, with respect to time

decibel (phy) The unit of noise intensity One-tenth of a bel, the number of decibels denoting the ratio of two amounts of power being 10 times the logarithm to the base 10 of this ratio The abbreviation *db* is commonly used for the term decibel Expressed as a formula it is

$$N=10 \log \frac{I_1}{I_2}$$

where I_1 and I_2 are the respective unit intensities (measured in watts) of two noises being compared, and N is the number of decibels by which one exceeds the other

deciduous (bot) Shedding at the end of growth, the opposite of evergreen

deck (ship) A deck in a ship corresponds to the floor in a building Decks are named or numbered by the naval architect designing the ship and bear these names and numbers from that time on

deck beam (ship) A beam which supports a deck.

deck beam stringer plate (ship) A plate stringer placed on the beam ends of any deck, the stringers take their names from the beams of the various decks on which they are laid Also called deck stringer plate, and deck beam stringer

deck girders (ship) Continuous longitudinals fastened under the deck.

deck house (ship) A small house erected upon the deck of a ship for any purpose.

deck line (ship) The line from forward to aft where a deck touches a ship's side.

deck pillar (ship) A pillar fitted to support a deck.

deck plan (ship) A drawing showing the layout of a deck.

deck plating (ship) Plates covering deck beams and thus forming an iron steel deck.

deck stringer angle bar (ship) An angle bar used to secure stringer plate of any deck to shell plating

deck transversals (ship) See deck beams.

deckle (paper) On the paper-making mold, the frame or border, usually of wood, which confines the paper pulp A strap on either side of the paper-making machine which limits the flow of the pulp and also determines the contour of the edge of the paper web

deckle edge (paper) The untrimmed feather edge of a sheet of paper formed where the pulp flows against the deckle.

declination (nav) The declination of a celestial point is its angular distance north or south of the celestial equator, measured along the hour circle passing through the point. See north declination and south declination.

decomposition (chem) The process of separating anything into its original parts or elements by chemical action or natural decay

decorated glass Glass to which etchings, stains, enamels, etc., have been applied, primarily for decorative purposes

deep etching (print) In photo-engraving, additional etching made necessary to secure proper printing depth.

deep floors (ship). Floors in the fore and aft ends of a vessel, so called on account of their greater depth.

deep tanks (ship). These usually consist of ordinary hold compartments but are strengthened to carry water ballast. They are placed at either or both ends of the engine and boiler space. They usually run from the tank top to or above the lower deck.

deep water line (ship). The line to which a vessel is submerged with a full cargo on board.

definition (phot). Clearness and sharpness of image.

deflation sleeve (aer). 1. A sleeve or appendix made of fabric provided for the special purpose of facilitating the deflation of an aerostat. 2. The sleeve or appendix fitted in the lower lobe of a kite balloon and used to permit the rapid escape of the air in the lobes when the balloon is hauled down.

deflectometer (StM). See proportional limit.

degree. 1. A 360th part of the circumference of a circle, or of a round angle. A degree is the principal unit of measure for arcs and angles. The degree is subdivided into 60 minutes, and the minute into 60 seconds. 2. A unit of measurement of temperature.

demodulation (rad). The process whereby a wave resulting from modulation is so operated upon that a wave is obtained having substantially the characteristics of the original modulating wave.

denatured alcohol (chem). There are two kinds of denatured alcohol, the completely denatured and the specially denatured alcohol. Ethyl alcohol which has been made unfit for beverage purposes is the former, the latter is ethyl alcohol which has been denatured so that it may be used in a greater number of industries and arts.

denier (text). A unit of yarn number. The number of unit weights of 0.05 gram per 450-meter length. A denier is equal numerically to the number of grams per 9,000 meters. Used in silk and rayons.

denim (text). A firm strong twilled cotton material usually made in dark blue or brown. Used for men's overalls and jumpers.

denitrification (chem). The removal of nitrogen from inorganic nitrates, nitrites and hyponitrites by chemical or bacterial action.

dense (phot). Applied to negatives which have been overexposed, underdeveloped or both.

density (phot). The degree of opaqueness of a negative.

density (phy). Compactness of matter.

density altitude (aer). The altitude corresponding to a given density in a standard atmosphere.

dent (text). A long slit or opening between the metal teeth of the reed. The number of these slits in one inch of the reed determines the number of threads to the inch in the woven material according to the way the warp threads are "sleyed" through, i.e., one thread through each dent, two threads through each dent, one thread through every other dent, or two threads through one dent and one through the next, etc.

dentelle (book). A fine tooled border resembling lace-work used in decorating book covers. A style of angular decoration which is in its simplest form like a row of teeth, and in more elaborate form like the points of point lace.

departure (dep.) (air nav). The linear measure in nautical miles of an arc of a parallel. Departure is also the distance to the eastward or westward made good by an airplane flying from one point to another.

deposited metal (weld). Metal that has been added by a welding process.

deposition efficiency (weld). The ratio of the weight of deposited metal to the net weight of the electrodes consumed (exclusive of stubs).

depth molded (ship). Measured amidships from the top of keel to the top of beam at the upper deck.

depth of field (phot) The distance from near to far over which a lens will render sharp definition

depth of focus (phot) The depth of focus is the allowable movement of the ground glass to maintain sharp focus

derrick. A steel or wooden drilling tower The framework or tower over a deep drill hole, such as that of an oil well, for supporting the tackle for boring, hoisting or lowering Any of the various types of hoisting apparatus employing a tackle rigged at the end of a spar or beam.

derrick (nav) An apparatus consisting of a mast or equivalent members held at the top by guys or braces, with or without a boom, for use with a hoisting mechanism and operating ropes

desiccated (chem) Anhydrous Applied to dry powder, not crystals. Refers to chemical salts from which all water has been removed.

design load (stress analysis) A specific load below which a structural member or part should not fail. It is the probable maximum applied load multiplied by the factor of safety Also in many cases, an appropriate basic load multiplied by a design load factor

destructive test (StM) A type of test designed to determine the ultimate resistive or bearing properties of a substance or structure

detail (phot) The definition recorded by a lens of the minute parts of a subject.

detail drawing One which carries the minutest detail pertaining to the construction of each component part of the assembly The detail drawing includes specifications of materials, dimensions, shop notes, changes, part numbers, finish, number of pieces required, and other information relative to the construction of the object, thus affording a complete picture of the part.

detail section (draw) Shown at some convenient location on the paper, entirely separate and removed from the regular projected view The detail section is located on the view by a cutting plane line. In order to clarify the construction of small details, this style of section is frequently drawn to a larger scale than the view on which the section is indicated.

detection (rad) Any process of operation on a modulated signal wave whereby the signal imparted to it in the modulation process is obtained

detector (rad) A device having an asymmetrical conduction characteristic which is used for operation on a frequency or combination of frequencies to produce certain desired frequencies or changes in current.

detergent (print) A prepared wash for cleaning type, etc.

detinning (metal) The process of removing the tin coating from tin plate, generally for the purpose of reclaiming the tin.

detonation (aut) A knock in an engine resulting from the too rapid burning of a fuel in the combustion chamber

developed plan form (aer) The plan of an airfoil as drawn with the chord lines at each section rotated about the airfoil axis into a plane parallel to the plane of projection and with the airfoil axis rotated or developed and projected into the plane of projection.

developer (phot) A chemical solution employed to bring out or render visible the latent image on films, plates or paper

developing agent (phot) A substance which has the power to convert into metallic silver a silver salt that has been exposed to the action of light. Examples pyrogallic acid, metol, elon, hydroquinone.

developing-out paper (phot) Sensitized paper upon which the photographic image is invisible until development has taken place Abbreviation, D O P

development (phot) The process of converting the latent or invisible image on a film, plate or paper into a visible image

development by triangulation (draw) In this type of development the inclined element is imagined to be the hypotenuse of a right triangular section, the base of which is the radius of the base of the cone, and the altitude the vertical height, this triangle is then revolved until the hypotenuse is parallel to the plane of projection, thus showing its true length

development of a surface (draw) In sheet metal drafting, the process of laying off a given area on a flat surface so that the resulting figure can be shaped correctly into the desired object. This procedure may be illustrated by wrapping the sides of an object tightly with a piece of paper cut to the right size to cover the surface of the object exactly, and then unfolding or unrolling the paper into a perfectly flat surfave.

deviation (air nav) The angular error between the axis of the compass needle and the magnetic meridian caused by magnetic influences in the aircraft. It is named east or west according to the direction in which the needle is deflected.

dew (met) A water deposit on the earth and objects thereon during hours of darkness, due to nocturnal cooling

dew point (met) The temperature at which the air would become saturated without altitude change.

dextrin (chem) An adhesive substance resembling gum arabic, obtained from the sap of plants, etc., for use in sizing paper, for gumming stamps, labels, and in bookbinding Also made artificially Dextrins are intermediate hydrolysis products of starch. They are water soluble and are precipitated by alcohol.

diagonal cutters (tool) A type of pliers convenient for cutting off small stock, such as cotter keys, in inaccessible places They are sometimes called diagonal side-cutting pliers

diagonal plates (ship) Plates fitted diagonally

diagonal pliers (el). See pliers

dial (tp) A type of calling device, which, when wound up and released, generates pulses required for establishing connections in a dial system

dial telephone system A télephone system in which telephone connections between customers are ordinarily established by electric and mechanical apparatus controlled by manipulations of dials operated by the calling parties.

dial tone (tp) A tone employed in dial telephone systems to indicate that the equipment is ready for the dialing operation

dialysis (chem) The separation of colloids from crystalloids, by utilizing the fact that the latter diffuse through a semipermeable membrane.

diamagnetic material (el) A material having a permeability less than that of a vacuum

diameters (opt) The number of times the linear dimensions of an object are multiplied by a microscope or magnifying lens. It is a measure of the "power" of the instrument.

diametral wire (aer) A chord wire that passes through or near the center of a main transverse frame. It is usually attached to the axial fitting

diamond. A pure carbon substance in a brilliant, crystalline form The hardest substance known Occurs naturally and can be made artificially but only in microscopic size. Used to tip turning and boring tools, and to cut glass.

diamond (print) The smallest size of type, usually cast equal to about 4½ points It is not often used except for notes and references in small books

diamond drill. A water-flush, rotary coring machine using drills studded with black diamonds This machine is chiefly used for exploratory work in drilling for oil in hard formations A form of rotary rock-drill in which the work is done by abrasion instead of percussion, black diamonds (borts) being set in the head of the boring tool It is used in prospecting and development work where a core is desired.

diaphragm opening (phot) The opening which admits light, through the lens, to the film. Commonly called "stop," or "stop opening"

diathermy (el) The therapeutic use of a high-frequency current to generate heat within some part of the body The frequency is greater than the maximum frequency for neuromuscular response, and ranges from several hundred thousand to millions of cycles per second.

diatomic (chem) Said of a molecule consisting of two atoms

dibasic (chem) Said of an acid in which the hydrogen atom is replaceable by two basic atoms or radicals

Dick process (metal) A process in which heated metal is forced through a die into shapes otherwise difficult or impossible to force or roll.

die (book) A small block with a design or letters engraved in it for impressing a softer substance A hard, sharp-edged shaper or device for stamping or for cutting out a design

die (mach) A tool used for cutting outside or male threads, as on a rod, pipe, or bolt. It is held, for turning leverage, in a stock.

die casting (metal) A process of casting molten metals in accurately-finished permanent molds, so that subsequent machining of the casting is rendered unnecessary

dielectric (el) A medium having the property that the energy required to establish an electric field is recoverable, in whole or in part, as electric energy A vacuum is a dielectric. A perfect dielectric is one in which all the energy required to establish an electric field in the dielectric is returned to the electric system when the field is removed. From the definitions, a perfect dielectric must have zero conductivity Also, all absorption phenomena must be lacking A vacuum is the only known perfect dielectric.

dielectric absorption (el) That property of an imperfect dielectric whereby there is an accumulation of electric charges within the body of the material when it is placed in an electric field.

dielectric constant (chem) A specific property of substance defined by D in the equation

$$f = Q_1 Q_2 / rD$$

where f is the force of attraction or repulsion between two charges Q_1 and Q_2, separated by a thickness "r" of the substance The dielectric constant of air is taken as unity

dielectric constant (el) The dielectric constant of a dielectric is that property which determines the electrostatic energy stored per unit volume for unit potential gradient.

dielectric loss (el) The time rate at which electric energy is transformed into heat in a dielectric when it is subjected to a changing electric field.

die maker (mach) One who makes dies or patterns used to stamp forms in metal with a punch press

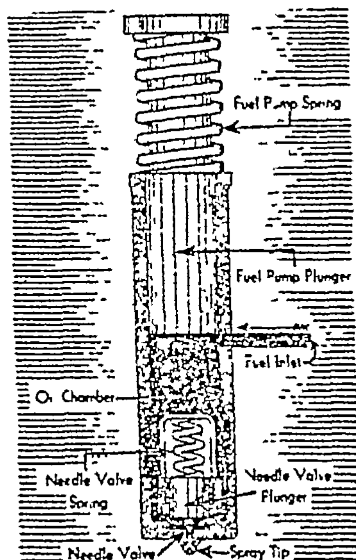
Diesel cycle (aut) A cycle of events which occur in Diesel engines similar to gasoline (Otto cycle) engines except that air without fuel is compressed to a high pressure At the end of the compression stroke fuel is injected into the hot compressed air and burned immediately

Diesel electric drive. A self-contained system of power conversion in which a Diesel engine supplies power to the driving motors through an electric generator which it operates The prefix "Diesel-electric" is applied to ships, locomotives, cars, buses, etc., which are equipped with this drive.

Diesel engine (aut) An internal combustion engine in which the fuel is ignited by the heat of compression. See also Diesel cycle.

Diesel fuel (aut) Diesel fuel, like gasoline, may have a paraffinic, naphthenic, or asphaltic base, depending upon the petroleum crude from which it is distilled. A representative sample of Diesel fuel contains approximately 86% carbon and 12% hydrogen. This content seldom varies more than plus or minus 2 or 3%

DIESEL FUEL INJECTOR



(Courtesy General Motors Corporation)

die sinker (mach) One who makes dies or forms used in drophammers in the process of drop forging

die stamping (print) Frequently employed for envelopes, cards, etc, the printing or stamping being done in relief by means of engraved intaglio die The die is usually a piece of steel having the letters or design cut in it. The engraved parts are filled with ink, the paper placed over the die, and the stamping done by means of a counter die of a hardened plastic substance which embosses the sheet by forcing the paper into the engraved parts, the result being a print with the letters or design slightly raised above the surface of the paper

difference (math). The result of the process of subtraction. Also called remainder

differential (aut) An automatic device fitted to the rear axle, permitting the wheels to revolve at a variable rate of speed It is necessitated by the fact that the outer wheel must turn faster than the inner wheel when the vehicle makes a turn

differential aileron linkage arrangement (aer) See aileron linkage arrangements

differential calculus (math) The study of the variation of a function with respect to changes in the independent variable or variables, by means of the concepts of derivative and differential, in particular, the study of slopes of curves, nonuniform velocities, accelerations, forces, approximations to the values of a function, maximum and minimum values of quantities, etc

differential thermometer One which works on the principle of the different expanding and contracting rates of two connected strips of different metals

diffused light (phot) Light which comes from a clouded sky, in contra-distinction to direct sunlight. Light which does not strike directly, but is arrested and diffused by some medium, such as ground glass

diffuser (phot) A sheet of sand-blown glass in an enlarger placed between the lamp and negative to distribute the light evenly over the entire negative

diffusing disks (phot) Made of optically flat glass with waves ground and polished into the surface Used to soften the focus of a lens

diffusion (chem) The flow of molecules, usually, but not necessarily, through a membrane

diffusion of focus (phot) Lack of "hair line" sharpness in a picture, producing a pleasingly soft effect.

diffusion potential (chem) When the oppositely charged ions of an electrolyte, having different mobilities, diffuse through a solution or across a membrane because of concentration differences, the mobility difference results in a separation of charge. This in turn produces electric potential differences, known as diffusion potentials, which act

to accelerate the slower and decelerate the more rapid ions so as to reduce the charge separation

digestion (chem) The maintenance of a fluid mixture for a length of time at a state of moderate heat until the mixture "ripens"

digit (math) Any one of the ten Arabic numerals

dihedral angle (aer) The acute angle between a line perpendicular to the plane of symmetry and the projection of the wing axis on a plane perpendicular to the longitudinal axis of the airplane. If the wing axis is not approximately a straight line, the angle is measured from the projection of a line joining the intersection of the wing axis with the plane of symmetry and the aerodynamic center of the half-wing on either side of the plane of symmetry

dilution (chem) Making thinner or weaker, as with water or gasoline.

dimension line (draw). A dimension line with its accompanying numeral indicates the distance between points on an object. Arrowheads are used at the extremities of the dimension lines.

diode (rad) A two-electrode vacuum tube containing an anode and a cathode.

dip (metal) A solution used for the purpose of producing a chemical reaction on the surface of a metal

dip brazing (weld) A group of brazing processes wherein the heat is obtained from a bath of molten metal or chemical, the filler metal may or may not be obtained from the molten metal bath. See also brazing

direct coupling (rad) The association of two circuits by means of a self inductance, capacitance, resistance or a combination of them which is common to the circuits.

direct current (el) A unidirectional current in which the changes in value are either zero or so small that they may be neglected. A given current would be considered a direct current in some applications, but would not necessarily be so considered in other applications. Also called continuous current.

direct current arc welding An arc welding process wherein the power supply at the arc is direct current.

direct grid bias (rad) The direct component of grid voltage. This is commonly called "grid bias"

directional antenna (rad) An antenna having the property of radiating or receiving radio waves in larger proportion along some directions than others. An antenna of this type used for transmitting is often called a directive antenna.

directional gyro (aer) A gyroscopic instrument for indicating direction, containing a free gyroscope which holds its position in azimuth and thus indicates angular deviation from the course.

directional stability (aer) Stability with reference to disturbances about the normal axis of an aircraft, i e., disturbances which tend to cause yawing

direction finder (rad) A radio receiving device which permits determination of the line of travel of radio waves as received.

direction of twist (text) A yarn or cord has S twist if, when held in a vertical position, the spirals conform in direction of slope of the central portion of the letter "S", and Z twist if the spirals conform in direction of slope to the central portion of the letter Z.

direction theodolite (surv) The direction instrument is distinguished by having only one vertical axis so that angles cannot be measured by repetitions; also it has two or more micrometer microscopes for reading the angles Vertical angles are read as on a transit except that the arc and vernier are graduated on the better class of instruments to read to ten seconds.

directive antenna (rad). See directional antenna.

direct printing (text) The printing or padding of the dyestuffs on the surface of the fabrics.

dischargeable weight (airship) All weight that can be consumed or discharged and still leave the airship in safe operating condition with a specified reserve of fuel, oil, water ballast, and provisions, and with the normal crew Also called "consumable weight."

discharge header (aer) The duct through which the air is conducted from the supercharger to the engine.

discharge printing (text) The printing of a pattern with chemicals on the surface of a dyed fabric When the cloth is submitted to the proper after-treatments, the color is removed at the points where the pattern has touched it.

discharge tube (el) An evacuated enclosure containing a gas at low pressure which permits the passage of electricity through the gas upon application of sufficient voltage. The tube is usually provided with metal electrodes, but one form permits an electrodeless discharge with induced voltage

disk clutch (aut) A clutch with more than three disks The disks are pressed together when the clutch is engaged, and the friction between them causes one to drive the other There are lubricated disk clutches and dry disk clutches.

dismantle (nav) To unrig a vessel and discharge all stores

dispersion (chem) Any mixture where one substance is very intimately intermingled with another Most frequently a dispersion refers to a colloidal suspension.

displacement (aut) See piston displacement.

displacement (ship) The total weight of a ship while afloat, including everything aboard.

displacement tonnage (ship) (light and loaded) Light is the weight of a ship excluding cargo, passengers, fuel, water and other accessories to the voyage. Loaded is the weight of a ship including these items Displacement is usually applied to war vessels

dissociation constant (chem) For a dissociated compound at equilibrium, the product of the concentration of anion by the concentration of cation, divided by the concentration of undissociated compound, is a constant for a definite temperature. This is called the dissociation constant, or ionization constant.

distance (air nav) The number of miles between any two points Distance may be expressed as statute or nautical miles. A statute mile is an arbitrary measurement and is equal to 5,280 feet. A nautical mile is the length of 1 minute of latitude, and for practical purposes is taken as 6,080 feet.

distance-rate-time formula (phy) The formula which states that the distance passed over by a body, moving at a fixed rate for a given time, is equal to the product of the rate and time, written $d=rt$.

distillation (petroleum). Separation of the more volatile parts of a petroleum oil from those less volatile by vaporization and subsequent condensation

distortion (phot) A lens defect whereby the straight lines near the edges of the field are not rendered as straight, but as curved. An incorrect rendering of the image so that it appears out of shape.

distortion (rad) A change in wave form occurring in a transducer or transmission medium when the output wave form is not a faithful reproduction of the input wave form.

distortion (ship) The result of excessive strains that cause a plate or a form to lose its proper shape.

distributer box (el) A box or pit through which cables are inserted or removed in a draw-in system of mains It contains no links, fuses or switches and its usual function is to facilitate tapping into a consumer's premises.

distributing roller (print). On the cylinder and some small presses, the roller which moves diagonally and endways back and forth over the inking plate or other rollers to distribute the ink evenly; the distributor, the vibrator

distribution graph (math) A graph showing the relation of parts to a whole and to each other A good example is the circular graph in which relative percentages of quantities are represented proportionally by sectors of the circle.

distribution switchboard (el) A power switchboard used for the distribution of electric energy at the voltages common for such distribution within a building Knife switches, air circuit breakers, and fuses are generally used for circuit interruption on distribution switchboards, and voltages seldom exceed 600 However, such switchboards often include switchboard equipment for a high-tension incoming supply circuit and a step-down transformer

diurnal variation (met) Changes occurring in an air mass over the period of a day, due to the succession of day and night and not associated with the advection of the air mass over varying terrain.

dive (aer) *A steep descent, with or without power, in which the airspeed is greater than the maximum speed in horizontal flight.*

dive (stress analysis) (aer) A design condition for the wings representing a steady state of flight characterized by high speed and an angle of attack approximately that of zero lift. See inverted flight and sudden pull up.

divergence (met) The flowing away from a point or zone of two or more air currents.

diverging lens (phy) See concave lens.

dividend (math) The number which is divided in the process of division.

dividers (draw) This instrument is similar to the compass except that both legs are equipped with points. It is used to transfer measurements on drawings, and for dividing a line into equal parts

dividers (mech) Tools for measuring distances between points, for transferring distances directly from a rule, or for scribing circles or parts of circles. They are convenient for dividing spaces into equal parts or determining the dimensions of irregularly-shaped work.

division (math) The process of finding one of two numbers when their product and the other number are given. Division is usually indicated by the symbol — or by a fraction whose numerator is the dividend and whose denominator is the divisor

divisor (math) The number by which the dividend is divided.

dobby (text) A loom on which small-figure weaves may be produced.

dock (aer) 1 A large shed used for housing airships. 2. To haul an airship into its dock.

docking cradle (aer) A support for the car of an airship while it is being inflated in the shed, mostly used with rigid airships.

docking rail (aer) A rail or guide, *installed on the landing field and extending* into the shed, which affords a means for resisting the lateral pull of an airship's docking or handling lines.

doctor In the mechanical arts this word is applied to a number of devices for specific purposes 1 An auxiliary or donkey engine. 2 A boiler feed-pump 3 A knife or long blade scraping across the face of a roller or cylinder to spread or to remove color or ink, as in a machine, rotogravure press, etc., and on a paper-making calender roll, to scrape off dirt. 4 An electric brush carrying a plating solution. 5 An implement for soldering 6 A support or backstay in a lathe, etc. 7 A greasy fluid for strengthening work on a lithographic stone.

dodecagon (geom) A polygon having twelve sides.

dodecahedron (sol geom) A polyhedron having twelve faces

dodging (phot) Any method of holding back light from a portion of a negative in order to give a more even tone to the whole print by distributing the quantity

of light according to the strengths of the different densities in the negative Also called "shading" and "local control."

doeskin (text) 1. A heavy twilled cotton fabric napped on one side Used for backing on artificial leather and on sport coats 2. A woolen fabric with short napped surface.

dog (mach) A device for holding the work in a lathe

dogs (ship) Holding devices used on doors, hatch covers, air ports and other hinged parts of a ship

dogs (text) Small parts which fit into the teeth of the ratchet to hold the beam firm They are released to let the beam turn as the cloth is wound forward.

dog vane (nav) A small wind vane placed on the truck or above the rail.

dogwood (*cornus muttallii*) A heavy, hard wood used in making mallets, pulley blocks, and rules Wt. 45 lbs per cu ft. (air-dried) Maximum crushing strength 11,310 lbs per sq in. Shearing strength parallel to grain 2,060 lbs per sq in

dolomite [(CaMg)CO_3] A mineral sometimes called magnesian limestone, used as a refractory lining for basic open-hearth furnaces

dolphin (nav) A piling or a nest of piles off a wharf or beach, or off the entrance to a dock, for mooring purposes

dome light (aut) An interior lighting unit mounted in the top of the vehicle.

donkey engine (ship) An auxiliary engine to operate the lifting apparatus on deck.

D O P. See developing out paper

dope (aer) See airplane dope, fuel dope.

dot leaders (print) Those cast with dots thus........, in distinction from hyphen leaders--------

double bottom (ship) A tank whose bottom is formed by the bottom plates of a ship, used to hold water for ballast, for the storage of oil, etc.

double character (print) A double type, a diphthong or ligature of two letters on one type body This is an example of a double character ﬁ.

double-current generator (el) A machine which supplies both direct and alternating currents from the same armature winding

double cut. A file tooth arrangement formed by two series of cuts the overcut, followed at an angle by the upcut.

double drift (air nav) A method of determining the force and direction of the wind by observing the drift angle on each of two or more headings at a known air speed, sometimes referred to as the multiple heading drift method.

double-end control. A control in which provision is made for operating a vehicle from either end.

double ender file. A saw file cut from the points toward the middle, for filing from either end.

double modulation (rad) The process of modulation in which a carrier wave of one frequency is first modulated by the signal wave and is then made to modulate a second carrier wave of another frequency

double reduction drive (mach) A method of transmitting power from the motor shaft to the driven axle by means of two sets of gear reductions

double-row radial engine (aer) An engine having two rows of cylinders arranged radially around a common crankshaft. The corresponding front and rear cylinders may or may not be in line.

doubler plate (ship) An extra plate of the same strength or stronger than the original plating, secured to the original plating for additional strength.

doublet antenna (rad) An antenna consisting of two elevated conductors substantially in the same straight line of substantially equal length, with the power delivered at the center

double-throw switch (el) A switch by means of which a change in circuit connections can be obtained by closing the switch blade into either of two sets of contacts

doublets (phot). Lenses mounted so that there is a front element and a rear element, either one of which may be removed from the lens mounting

double-welded butt joint. A butt joint welded from both sides

double-welded lap joint. A lap joint in which the overlapped edges of the members to be joined are welded along the edges of both members

doubling (text) The process in the manufacture of yarn, in which many slivers are drawn into one. The more the doubling process is performed, the more thoroughly the fibers are mixed and blended.

Douglas fir (*pseudotsuga taxifolia*) A yellow wood used for railroad ties, heavy timbers, and interior finish. Wt. 30-34 lbs. per cu. ft. (air-dried) Maximum crushing strength 7,090-10,680 lbs per sq in. Shearing strength parallel to grain 1,080 to 1,270 lbs per sq in.

douse (nav) To lower quickly, as dousing a sail.

dovetail joint (carp) A joint made by cutting pins, the shape of dovetails, which fit between dovetails upon another piece

dowel pin (aut-carp). A pin of wood or metal which alines or secures two parts to prevent movement between them. Often called simply "dowel."

down (nav) Toward the lee side It is used in connection with the tiller which may be "put down" (up rudder), toward the lee side, or "up" (down rudder) toward the windward side This wording was derived from the fact that a sailing vessel practically always lists away from the wind, therefore, the lee side is really down and the weather side up

downdraft (met) Any vertical wind directed downward, but particularly in or near a cumulus cloud and thunderstorm, or in mountainous regions.

down hair (text) The soft, fine undergrowth of hair Certain animals, such as goats and camels, produce both coarse, beard hair and fine, down hair

downhaul (nav) A tackle to exert a downward pull on a sail.

downwash (aer). The air deflected perpendicular to the direction of motion of an airfoil.

downward angle (aer) The angle through which an air stream is deflected by any lifting surface. It is measured in a plane parallel to the plane of symmetry

drafting paper (paper). A fine, white or cream, hard-surfaced paper of good erasure quality upon which to make drawings

drag (aer) The component of the total air force on a body parallel to the relative wind.

drag (print) When the end of a sheet printed on a cylinder press does not print clear and sharp because of not being held close to the cylinder, it is said to drag.

drag (weld) The horizontal distance between the point of entrance and the point of exit of a cutting oxygen screen.

drag direction (stress analysis) (aer). The direction of the relative wind (cf beam, chord, lift, and side directions).

drag force (stress analysis) (aer) A force or component, in the drag direction, i e, parallel to the relative wind; also called "drag component." (cf beam, chord, lift, and side forces)

drag rope (aer) A long rope which can be hung overboard from a balloon so as to act as a brake and a variable ballast in making a landing Sometimes called "trail rope" or "guide rope"

drag strut (aer) A fore-and-aft compression member of the internal bracing system of an aircraft

drag wire (aer) See antidrag wire

dragon's blood (print) Any of several resinous substances mostly dark red in color It is used in powdered form in photo-engraving, for etching line plates. Dragon's blood powder is brushed up against the slightly raised lines of the image or design on the metal plate from four sides, and "burned in," thus protecting these lines against the action of the etching solution or acid.

drain plug (aut) A threaded plug at the bottom of a gasoline tank or oil pan, used to drain out gas or oil for purposes of cleaning and repairing the container

draught marks (ship) The stern and stem are marked in feet to show the draught or depth of the vessel

draw (nav) The sails are said to be "drawing" when they are filled with wind so as to give the boat headway

drawboard joint (carp) A mortise-and-tenon joint with holes so bored that when a pin is driven through, the joint becomes tighter

drawing (text) The pulling out or attenuating of the big, soft rope of fibers (preparatory to the spinning operation) into the desired size of yarn.

drawing cloth (draw) A fine linen cloth treated so as to make it translucent and smooth, generally used for ink tracing The dull side of the cloth is used and, prior to inking, the surface is lightly sprinkled and rubbed with powdered chalk or soapstone. Where an erasure has been made, the cloth is again treated with chalk or soapstone

drawing pencils (draw) Drawing pencils are graded from 6B (softest) through 5B, 4B, 3B, 2B, B, HB (medium soft), F, H (medium hard), 2H, 3H, 4H, 5H, 6H, 7H, 8H, to 9H (extremely hard) Grades 4H and 6H are generally used for drawing lines while grades F, H, and 2H are preferred for lettering and sketching

drawing to scale. See scale.

drawknife (carp) A smoothing tool used to supplement the hatchet or the adze. It is used to remove a small amount of wood and is employed especially on round timber It consists of a single-bevel, knife-edged, steel blade, approximately 1½ inches wide and 12 inches long. At each end of the blade are wooden handles at right angles to the blade

dribbling (aut) A characteristic of an injection nozzle in which the fuel seeps slowly from the nozzle tip Generally in Diesel engines,

drier A substance added to ink, paint, or varnish to make it dry quicker

drier (paint) In linseed-oil paints, the drier is often added to hasten the hardening (oxidation) of the oil. It is generally a salt of manganese or some other suitable substance.

drift (air nav) The angle between the heading and the track. Named right or left according to the way the aircraft is drifted.

drift angle (aer). The horizontal angle between the longitudinal axis of an aircraft and its path relative to the ground.

drift bolt (carp) See drift pin.

drift correction (air nav) The angle added to or subtracted from an aircraft's course (true) to obtain heading In case of a right drift the angle is subtracted from the course to obtain the heading, and in case of a left drift, it is added.

drift float (air nav) An article or substance dropped from an aircraft over water, forming a point of reference for observing the drift angle or the surface wind direction.

drift pin (carp) A long, heavy, threadless bolt used to hold heavy pieces of timber together The term drift pin is almost universally used in practice, however, for accuracy, the correct designation is "drift bolt."

drift pin (ship) A small tool used to draw adjoining parts in line so that the rivet holes will coincide.

drill (text) A stout, twilled cotton material, bleached, unbleached, or dyed. There are many grades and weights Used for middy blouses, summer trousers, heavy linings, and pockets Also called "drilling"

drilling (book) A stiff cotton cloth used by bookbinders Same as drill.

drip (bldg) The projection of a window sill or water table to allow the water to drain clear of the side of the house below it.

drip flap (aer). A strip of fabric attached by one edge to the envelope of an aerostat so that rain runs off its free edge instead of dripping into the basket or car It also assists in keeping the suspension ropes dry and nonconducting Also called "drip band" or "drip strip."

drive (aut) A collective term for the power-transmission parts of an automotive vehicle. The drive consists of the clutch, the transmission gears, the drive shaft, and the differential

drive fit. See fits.

drive pinion (aut) Located at the end of the drive shaft, this gear drives the bevel gear connected with the differential

drive shaft (aut) The shaft running from the transmission shaft to the rear axle which it turns by means of bevel gears The drive shaft is connecting at its receiving and driving ends by universal joints Also called "propeller shaft."

driving face (aer) See blade face

drop-away (el). The electrical value which in the gradual reduction of the current energizing an electromagnetic instrument will cause the moving member to move to the position which will open the front and make the back contacts and/or visually indicate its de-energized position.

drop forging (metal) A process for multiple production of metal parts. The metal is forged between two dies, one moving up and down with the hammer, and the other attached to the anvil block.

drop hammer (metal) Any type of hammer which is first raised and then allowed to fall by gravity, as distinguished from the steam or power hammer, in which the blow of the hammer is power-driven.

drop-out voltage (el). The drop-out voltage (or current) of a magnetically operated device is the voltage (or current) at which the device will release to its de-energized position

dross (metal) The impurities which are skimmed off the surface of molten metals

drum cylinder press (print) A printing machine in which the sheet of paper is carried to the impression on a large cylinder Only part of the surface of the cylinder is used for the actual printing, the other part being blank and cut down, so that it will not touch the printing form on the bed The bed goes forward and backward for each complete revolution of the cylinder The impression is made on the forward motion, and while the bed is returning for the next impression it passes under the cut-away portion of the cylinder

drum switch (el) A switch in which the electric contacts are made on segments or surfaces on the periphery of a rotating cylinder or sector, or by the operation of a rotating cam

dry air island (met) An isolated region of dry air surrounded by air of greater water content.

dry air tongue (met) An elongated region of dry air

dry battery See dry cell

dry-bulb temperature (met) The temperature of the atmosphere as measured by a dry bulb, i e, an ordinary thermometer

dry cell (el) A cell in which the electrolyte exists in the form of a jelly or is absorbed in a porous medium, or is otherwise restrained from flowing from its intended position, such a cell being completely portable and the electrolyte non spillable. A typical dry cell consists

of a carbon rod, a zinc container (the electrodes), and a moist paste made of ammonium chloride (the electrolyte) The chemical action of the paste and the electrodes produces an electric current.

dry color (paint) Any dry coloring matter suitable for grinding or mixing in oil, water or other medium, for printing or painting

dry disk clutch (aut) See disk clutch.

dry dock (ship) A dock into which a vessel is floated, which when raised, lifts the boat out of the water

dry ice Trade name for solid carbon dioxide gas Used for refrigeration, testing of panels coated with finishes to determine their reaction at low temperatures, etc.

drying oil (paint) A comparatively highly unsaturated oil which absorbs oxygen to become a stable, insoluble solid film. Linseed oil is largely used in the paint industry because of this property

dry mounting (phot) A method of mounting prints using mounting tissue (covered with shellac or other suitable gums) and the pressure of a hot iron

dry point (art) 1 A sharp needle on a handle used in engraving on metal plates, to cut into fine lines without acid or etching ground. 2 An intaglio engraving made in this manner

dry rot (lumber) The most common and the most dangerous form of decay in timber It is a disease which spreads from one part of the wood to another causing the wood to lose its strength and cohesive power and eventually to decay altogether Dry rot occurs mostly where timber is kept alternately wet and dry, or where there is no ventilation. The rot occurs on the inside of timber and leaves a shell on the outside, the inner part becomes soft and powderlike

dry weight of an engine (aer) The weight of an engine exclusive of fuel, oil, and liquid coolant.

dual valve engine (aut) One which has two inlet and two exhaust valves for each cylinder

duck (text) A close, heavy cotton fabric, plain weave Sometimes two yarns used as one in the warp White or colored Many widths and weights Heavy grades practically watertight and used for tents, awnings, sails, tarpaulins, and in the lighter weights for clothing

duct (el) A single enclosed runway for conductors or cables

duct bank (el) An arrangement of conduit providing one or more continuous ducts between two points An underground runway for conductors or cables, large enough for a workman to pass through, is termed a gallery or tunnel Also called "conduit run"

ductile materials (StM) Those which are capable of undergoing considerable permanent deformation while subjected to tensile stresses

ductility (StM) The property of a material which permits it to be permanently drawn, bent, or twisted into various shapes without fracture

Dufaycolor (phot) Trade name for a screen process of color photography

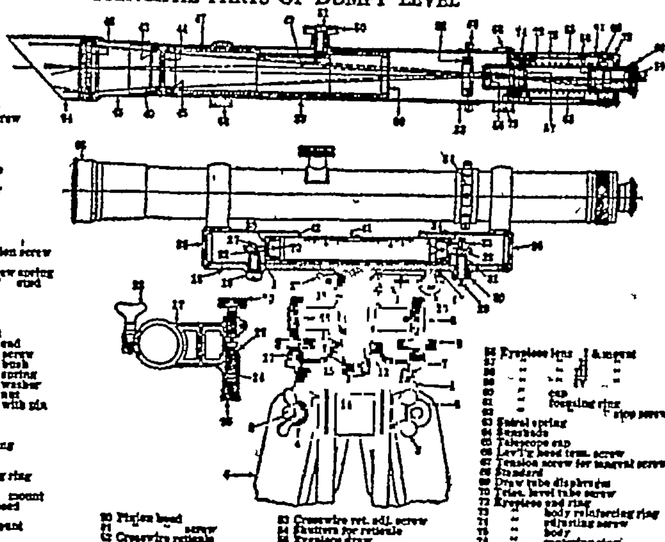
dull finish coated paper Paper which has been first treated with a smooth coating, and then with an additional coating to remove the gloss

dumbwaiter A hoisting and lowering mechanism equipped with a car, which moves in guides in a substantially vertical direction, the floor area of which does not exceed 9 square feet, whose compartment height does not exceed four feet, the capacity of which does not exceed 500 pounds, and which is used exclusively for carrying freight.

dummy (print) A few pages or parts of a proposed book, pamphlet, or other work, put together so as to show in advance the plan, design, or arrangement to be followed.

dump (print) The place in a composing room where dead matter is placed until

PRINCIPAL PARTS OF DUMPY LEVEL



(Illustration Copyright, Keuffel & Esser Co.)

it is needed for distribution, sometimes this may be a standing galley having partition lines with brass or zinc, or a zinc-covered table or other frame.

dumpy level (surv) This level has a telescope about 12½ inches long, rigidly attached to a frame consisting of two vertical supports, a horizontal bar, and a central vertical spindle The spirit level is fastened to the horizontal bar just underneath and parallel to the telescope tube, and can be adjusted in a vertical plane. The telescope is provided with stadia wires in addition to the cross wires. The dumpy level is used in setting elevations for buildings, excavations, foundations, etc., as well as for carrying street levels for sidewalks, curbs, etc., and grades for pipelines, sewers, etc.

duodecimo (book) A sheet folded to make twelve leaves usually indicated as 12mo or 12o It is smaller than octavo (8vo) and. like it, is of no fixed dimensions

duplex cable (el) A cable composed of two insulated stranded conductors twisted together They may or may not have a common insulating covering

duplex operation (tg) The operation of associated transmitting and receiving apparatus at one location in conjunction with associated transmitting and receiving equipment at another location, in which the processes of transmission and reception are simultaneous

duplex paper 1. Paper each side of which bears a different color 2. A machine-finished paper which is highly glazed on one side and left rough on the other 3 A paper plied with two layers of different colors or stocks

duplex press (print) Said of a printing machine which prints both sides of the paper, the sheet going from one printing form to another at one feeding

duplex switchboard (el) A structure with front and rear panels of metal or insulation material, separated a comparatively short distance, and enclosed at both ends. No primary switching devices are located between front and rear panels

The rear panels may be hinged for access to panel wiring

duplex system (tg) A telegraph system which affords simultaneous independent operation in opposite directions over the same channel.

duralumin (metal) Duralumin was the name originally given to an aluminum alloy patented in Europe. The alloying elements, copper and magnesium, in small percentages, produced greatly improved physical properties in the metal after heat treatment. For many years the word "duralumin" (often abbreviated to "dural"), was used in referring to aluminum alloys containing the material mentioned above. However, the producers of most of the aluminum used in this country do not acknowledge the name "duralumin" because the term is too general. There are a number of the strong aluminum alloys each containing slightly different alloying elements or the same elements in different quantities. The characteristics and physical properties of these alloys vary considerably Hence no one word is adequate to designate all of them The manufacturers usually distinguish between approximately pure aluminum and the alloys mentioned above by referring to the latter as the heat-treatable alloys

durometer (StM). An instrument for testing the hardness of materials by measuring the height of rebound of a steel ball dropped upon a specimen set at an angle of 45 degrees

dust (met) Atmospheric pollution originating in arid regions It is often carried thousands of miles by prevailing winds.

duster (paper) In the paper-making industry, a dusting machine an equipment of huge, hollow, meshed-wire drums provided with revolving blades for stirring up rags and sifting out the dirt.

duty (el) A requirement of service which defines the degree of regularity of the load.

dyeing (text) The coloring of material with dyestuffs, from an aqueous solution. See cross dyeing, stock dyeing, and yarn dyeing.

dynamic amplifier (rad) A dynamic amplifier is a variable gain audio amplifier, the gain of which is proportional to the average intensity of the audio signal. Such an amplifier compensates for the contraction of volume range required because of recording or transmission line limitations

dynamic balance (phy). The balance of a body which is rotating or in motion

dynamic factor (stress analysis) (aer). The ratio between the load carried by any part of an aircraft when accelerating and the corresponding basic load.

dynamic lift (aer) The component of the total aerodynamic force on a body perpendicular to the relative wind.

dynamic load (StM) A type of load or strain that is repeated at intervals, as distinguished from a static or constant load.

dynamic loudspeaker (rad) See moving-coil loudspeaker.

dynamic microphone. See moving-coil microphone.

dynamic pressure (aer) The product ½ p V^2 where p is the density of the air and V is the relative speed of the air

dynamics (phy) The study of masses and forces. The study of the effect of forces in causing or modifying the motions of masses and producing strains in elastic bodies. It is usually treated under two heads statics and kinematics.

dynamic sensitivity of a phototube (rad). The alternating-current response of a phototube to a pulsating light flux at specified values of mean light flux, frequency of pulsation, degree of pulsation, and steady tube voltage.

dynamic speaker (rad) See moving-coil loudspeaker

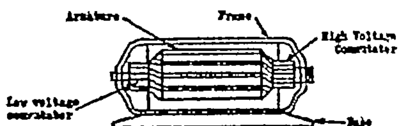
dynamic stability (aer) That property of an aircraft which causes it, when its state of steady flight is disturbed, to damp the oscillations set up by the restoring forces and moments and gradually return to its original state

dynamic strength (StM) Resistance to loads suddenly applied, such as shocks, or repeated stresses

dynamometer An instrument designed to measure the amount of work performed by an engine or motor

dynamotor (el) A machine which combines both motor and generator action in one magnetic field, either with two armatures or with one armature having two separate windings

CUTAWAY VIEW OF A DYNAMOTOR



dyne (el) *The metric unit of force* The force which produces an acceleration of one centimeter per second per second when applied to a mass of one gram.

Dzus fastener (sheet metal) Trade name for a type of sheet metal fastener used largely in the aviation industry for holding cowls, inspection covers, etc. The complete fastener consists of a grommet, spring, and stud The stud is locked by a spring and is released by a quarter turn The head of the stud may be oval, flat, or of the wing type

E

ear (el-RR) A metal fitting attached to a contact wire, commonly for the purpose of suspending it. Ears which are bent or formed around a contact wire are commonly termed "clinch ears", and those which are fastened mechanically are termed "clamp ear" In the railway and railroad field these ears are frequently referred to as "trolley anchor clamps", "trolley clamps", etc.

earth (el) (British) See ground

earth inductor compass (aer) A compass the indications of which depend on the current generated in a coil revolving in the earth's magnetic field. Also called "earth induction compass"

earth return circuit. See ground return circuit.

ease off (nav) To slack away a line To head off from the wind.

eastern hemlock (*tsuga canadensis*) The wood is yellowish-green in color The bark is used for tanning Wt. 28 lbs per cu ft. (air-dried) Maximum crushing strength 7,060 lbs. per sq in Shearing strength parallel to grain 1,160 lbs. per sq in.

eccentric. A circle having a different center from another within it, a device mounted off-center for converting rotary motion into reciprocating motion

echo (rad) A wave which has been reflected from one or more impedance irregularities or otherwise returned with sufficient magnitude and delay to be perceived in some manner as a wave distinct from that directly transmitted

eddy (met) Any small-or large-scale whirl in the atmosphere.

eddy (nav) A circular motion in the water caused by the meeting of opposite currents.

eddy currents (el) Those currents which are induced in the body of a conducting mass by a variation of magnetic flux. The variation of magnetic flux may be the result of a varying magnetic field or of a relative motion of the mass with respect to the magnetic field. Also called Foucault currents

edge bolt (book). The uncut fold of the leaves in a bound book.

edge joint (weld) A welded joint connecting the edges of two or more parallel or nearly parallel parts

edge preparation (weld) A prepared contour on the edge of a part to be joined by a groove weld

Edison distribution system (el) A three-wire direct-current system, usually about 120-240 volts, for combined light and power service from a single set of mains

Edison effect (el). See thermionic emission.

effective aspect radio (aer) The aspect ratio of an airfoil of elliptical plan form, that, for the same lift coefficient, has the same induced-drag coefficient as the airfoil, or the combination of airfoils, in question.

effective helix angle (aer) The angle of the helix described by a particular point

on a propeller blade as the airplane moves forward through air otherwise undisturbed.

effective landing area (aer) That portion of the landing area, with approaches clear within the allowable safe climbing and gliding angle, available for the take-off and landing of aircraft.

effective length of weld The length of the correctly proportioned cross section of a weld.

effective pitch (aer) The distance an aircraft advances along its flight path for one revolution of the propeller

effective profile drag (aer) The difference between the total wing drag and the induced drag of a wing with the same geometric aspect ratio but elliptically loaded.

effective propeller thrust (aer) The net driving force developed by a propeller when mounted on an aircraft, i e., the actual thrust exerted by the propeller, as mounted on an airplane, minus any increase in the resistance of the airplane due to the action of the propeller.

effective span (aer) The true span of a wing less corrections for tip loss

efficiency (phy) The efficiency of a device with respect to a physical quantity which may be stored, transferred or transformed by the device is the ratio of the useful output of the quantity to its total input. Unless specifically stated otherwise, the term "efficiency" means efficiency with respect to power

egg-shell finish (paper) Said of a paper or cardboard having a firm, smooth, but not polished surface, resembling that of a smooth egg-shell.

eidograph (draw) An instrument for copying drawings on the same or different scale, a form of pantograph.

elastic axis (stress analysis) (aer) The locus of all points through which a force may be applied to a structure without causing torsional deflection

elastic center (stress analysis) (aer). A point within the wing section at which the application of a single concentrated load will cause the wing to deflect without rotation and, conversely, a point within the wing section about which rotation occurs when the wing is subjected to rotational deflection.

elasticity (StM) The power to recover from stretching, straining, pressure, etc. In bodies which are homogeneous and isotropic there are two principal kinds of elasticity, that in virtue of which the body resists change of volume and that resisting change of shape Elasticity is measured by the ratio of the stress to the corresponding strain.

elastic limit (stress analysis) The greatest stress which a material is capable of developing without permanent deformation upon complete release of the stress

elastic limit (StM) In tensile and compressive tests the stress at which the initial permanent elongation or shortening of the gage length occurs, as shown by an instrument of high precision (determined from set readings with extensometer or compressometer) In transverse tests the extreme fiber stress at which the initial permanent deflection occurs as determined with a deflectometer Tests are rarely made to determine the elastic limit, since such tests involve repeated application and release of load and require considerable time For practical purposes the elastic limit may be regarded as equal to the proportional limit. Note: the proportional limit and elastic limit are indefinite, and widely different values may be reported for the same material unless definite limits are prescribed for the minimum departure from a straight line or the minimum permanent set which shall be considered significant.

elastic stop nut. See self-locking nut.

electric. Containing, producing, arising from, actuated by, or carrying electricity, or designed to carry electricity and capable of so doing. Examples: electric eel, energy, motor, vehicle, wave Compare "electrical." Some dictionaries indicate these terms as synonymous but usage in the electrical engineering field

has in general been restricted to the meaning given in the definition above. It is recognized that there are borderline cases wherein the usage determines the selection. (From "American Standard Definitions of Electrical Terms"—1941)

electrical. Related to, pertaining to, or associated with electricity, but not having its properties or characteristics. Examples: electrical engineer, handbook, insulator, rating, school, unit. Compare "electric."

electrical attraction (print). This is a process still in the experimental stage but claimed to hold promise of becoming a definite part of the graphic arts. In this method the surface to be printed never touches the form, thus wear of type and plates is eliminated. The principle is to let the relief (or typographic) plates and type be one electrical pole, and the impression cylinder carrying the paper, be the other electrical pole. After the form is inked, the paper is carried to within approximately one-eighth inch of the type and electrical attraction forces the ink to jump the gap from type to paper.

electrical brakes (aut). Suitable for trailers or where remote control installations are needed. Electrical brakes depend on the electrical (or a special) system of the vehicle for their operation. They are controlled through a rheostat either operated by hand or synchronized with the foot brake pedal. In actual operation, while a floating ring type electromagnet engages a rotating armature ring (or disk), a lug on the electromagnet engages a cam which applies the brakes.

electrical degree. The 360th part of the angle subtended, at the axis of a machine, by two consecutive field poles of like polarity. One mechanical degree is thus equal to as many electrical degrees as there are pairs of poles in the machine.

electrical precipitation (chem). See Cottrell precipitation.

electrical system (aut). Usually consists of the starting, lighting, ignition, generating, and horn circuits, and includes all electrical units of each and every circuit.

electric bell. A signaling apparatus in which a hammer is actuated electromagnetically so as to strike a gong or bell.

electric brazing (weld). A group of brazing processes wherein the heat is obtained from electric current. See also brazing.

electric-capacity altimeter (aer). An altimeter, the indications of which depend on the variation of an electric capacity with distance from the earth's surface.

electric circuit (el). A path or a group of interconnected paths capable of carrying electric currents.

electric current (el). An electric current through a surface is the time rate at which positive or negative electricity passes through the surface. If both positive and negative electricity simultaneously pass through the surface, it is the time rate of passage of the algebraic sum of the two.

electric depth finder (aer nav). An electrically operated device which determines exactly the lapse of time between the emission of oscillator signals or other mechanically or electrically propagated sound waves downward from ships at sea or from aircraft over land, and the return of the echo to an electric receiver from the ocean bottom or from the surface of the land, as the case may be. Knowing the speed at which sound travels through the water or air, the depth of water beneath the ship or the depth of air beneath the airplane (the actual height above land—not the altitude above sea level) may be calculated once the time lapse is determined. Calculations are not always necessary, since most depth finders are calibrated to read directly in feet.

electric discharge lamp (el). A lamp in which light is produced by the passage of electricity through a metallic vapor or a gas enclosed in a tube or bulb.

electric filament lamp (el) A light source consisting of a glass bulb containing a filament electrically maintained at incandescence

electric generator (el) A machine which transforms mechanical power into electric power

electrician's knife (el) The electrician's knife consists of a handle, screwdriver blade and cutting blade It is a larger and sturdier type of the familiar Boy Scout knife, and is used to remove insulation from wires, to drive small screws, etc

electricity A physical agent pervading the atomic structure of matter and characterized by being separable, by the expenditure of energy, into two components designated as positive and negative electricity, in which state the electricity possesses recoverable energy

electric lock (RR) A device to prevent or restrict the movement of a lever, a switch, or a drawbridge unless the locking member is withdrawn by an electric device, such as an electromagnet, solenoid or motor

electric locking (RR) The term applied to the combination of one or more electric locks and controlling circuits by means of which levers of an interlocking machine, or switches or other units operated in connection with signaling and interlocking, are secured against operation under certain conditions as follows 1 approach locking, 2. indication locking, 3 switch-lever locking, 4 time locking, 5 traffic locking

electric locomotive (RR). A vehicle on wheels, designed to operate on a railway for haulage purposes only, the propulsion of which is effected by electrical means. The prefix "electric" is applied to cars, buses, etc., of this type.

electric motor A machine which transforms electric energy into mechanical energy

electric potential (el) The electric potential of a point is the potential difference between the point and some equipotential surface, usually the surface of the earth, which is arbitrarily chosen as having zero potential A point which has a higher potential than a zero surface is said to have a positive potential, one having a lower potential has a negative potential

electric potential difference See potential difference

electric power substation (el) An assemblage of equipment for purposes other than generation or utilization, through which electric energy in bulk is passed for the purpose of switching or modifying its characteristics Service equipment, distribution transformer installations or other minor distribution or transmission equipment are not classified as substations

electric switching locomotive (RR) An electric locomotive designed for yard movements of freight or passenger cars, its speed and continuous capacity usually being low

electric switch lock (RR) An electric lock connected with a switch or switch movement to prevent its operation until released

electric telemeter The complete measuring, transmitting and receiving apparatus for indicating, recording or integrating at a distance, by electrical translating means, the value of a quantity (A telemeter which measures current is called a teleammeter; voltage a televoltmeter, power, a telewattmeter The names of the various component parts making up the telemeter are in general, self-defining, e g, the transmitter, pilot wires, receiver, indicator, etc.).

electric trail car (el). A car not provided with motive power, which is used in a train with one or more cars Also called "electric trailer"

electrification 1 Electrification of a body is the process of establishing an excess of positive electricity or negative electricity in a body 2. The process of converting a steam power railroad to electric power

electrified track (RR) A suitably equipped track in association with a contact conductor or conductors for the operation of electrically propelled vehicles

electroacoustic transducer (rad) A transducer by which power may flow from an electric system to an acoustic system or vice versa

electroanalysis (chem) The electrodeposition of an element or compound for the purpose of determining its quantity in the solution electrolyzed

electrocardiogram (el) A graphic trace of the variation with time of the electric current or voltage associated with action of the heart muscles

electrochemical equivalent. An electrochemical equivalent of an element, compound, radical, or ion is the weight of that substance involved in a specified electrochemical reaction during the passage of a specified quantity of electricity, such as a faraday, ampere-hour, or coulomb

electrochemistry. That branch of science and technology which deals with reciprocal transformations of chemical and electric energy

electrode (aut) One of the insulated points of a spark plug

electrode (el chem) An electrode is a conductor belonging to the class of metallic conductors, but not necessarily a metal, through which a current enters or leaves an electrolytic cell, arc, furnace, vacuum tube, gaseous discharge tube, or any conductor of the non-metallic class Specifically, in an electrolytic cell, an electrode is a conductor of the metallic-conductor class, at which there is a change from conduction by electrons to conduction by ions or colloidal particles

electrode (weld) The part or parts of a resistance welding machine through which the welding current and pressure are applied directly to the work. 1 In metal arc welding The filler metal in the form of a wire or rod, either bare or covered, through which current is conducted between the electrode holder and the arc. 2. In carbon arc welding A carbon or graphite rod through which current is conducted between the electrode holder and the arc. 3 In atomic hydrogen welding One or two tungsten rods between the points of which the arc is maintained 4 In resistance welding A bar, wheel, clamp or die through which the current is conducted and the pressure applied to the work.

electrode holder (weld) A device used for mechanically holding the electrode

electrodeposition (chem-metal) The process of depositing a substance upon an electrode by electrolysis Electrodeposition includes electroplating, electroforming, electrorefining, and electrowinning

electrode potential (chem) The potential developed on an inert metal, such as platinum, when it is inserted in a reversible oxidation-reduction system.

electrodissolution (chem) The process of dissolving a substance from an electrode by electrolysis

electrodynamic instrument (el) An instrument which depends for its operation on the reaction between the current in one or more moving coils and the current in one or more fixed coils

electrodynamometer An instrument in which the mechanical reactions between two parts of the same circuit are used for detecting or measuring an electric current

electroextraction (metal). The extraction by electrochemical processes of metals or compounds from ores and intermediate compounds

electroforming The production or reproduction of articles by electrodeposition.

electrokinetics (el) That branch of science which deals with the laws of electricity in motion. The study of motion set up by an applied electromotive force, and of the production of an e.m.f. by motion such as the flow of liquids

electrolysis (el-chem). The production of chemical changes by the passage of current through an electrolyte

electrolyte (el-chem) 1 A conducting medium in which the flow of electric current is accompanied by the movement of matter 2. A substance which when dissolved in a specified solvent (usually water) produces a conducting medium. 3 An acid, base, or salt, which when dissolved in water, dissociates into electrically charged particles called ions. The solution can conduct an electric current.

electrolytic cell (el-chem) A unit apparatus designed for carrying out an electrochemical reaction and including a vessel, two or more electrodes, and one or more electrolytes

electrolyzer. An electrolytic cell for the production of alkali, chlorine, hypochlorites or other allied products.

electromagnet (el) A magnet formed by passing a current of electricity through wire wound around a core.

electrometallurgy That branch of science and technology which deals with the application of electrochemistry or electrothermics to the extraction or treatment of metals.

electrometer An instrument for detecting or measuring a potential difference by means of the mechanical forces exerted between electrically charged bodies An instrument for indicating or measuring potential difference by electrostatic means

electromotive force. Denoted by E.M.F 1. That which causes current to flow 2. The energy added per unit charge due to the mechanical or chemical action producing the current. 3 The open circuit difference in potential between the terminals of a cell or generator 4 The property of a physical device which tends to produce an electric current in a circuit.

electromotive series (electrochemical series) A table which lists in order the standard potentials of specified electrochemical reactions

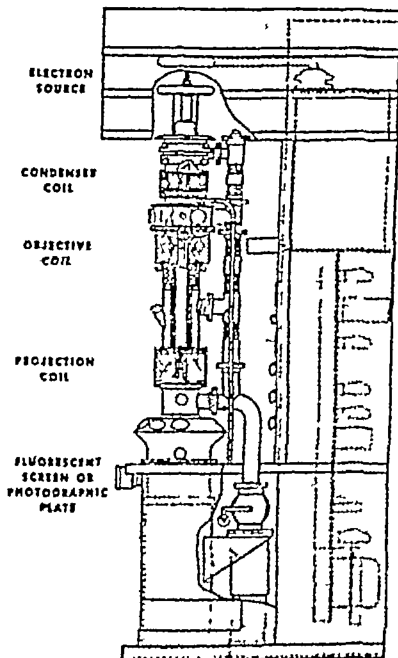
electron (el) The natural, elementary quantity of negative electricity The quantity of electricity on an electron is 1.592×10^{19} coulomb, or 4.774×10^{-10} electrostatic unit. The mass of an electron at rest is 9.00×10^{28} gram.

electron emission (el) The liberation of electrons from an electrode into the surrounding space. Quantitatively, it is the rate at which electrons are emitted from an electrode

electronic instrument. An instrument which utilizes for its operation the action of an electronic (thermionic) tube Also called "thermionic instrument."

electronics. That branch of science and technology which relates to the conduction of electricity through gases or in vacuo

electron microscope. A newly developed microscope using electrons instead of



Simplified drawing showing the construction of the electron microscope

(Courtesy Radio Corporation of America)

light rays and electromagnetic fields instead of glass lenses. Magnifications up to 100,000 diameters are obtainable, which makes the electron microscope from 50 to 100 times more powerful than the strongest optical microscope. It has important applications in chemistry, biology, and metallurgy.

electrons (chem) Tiny particles, negatively charged, which together with protons, go to make up an atom.

electron tube (rad) A vacuum tube evacuated to such a degree that its electrical characteristics are due essentially to electron emission.

electro-optical effect (in dielectrics). Certain transparent dielectrics when placed in a strong electrostatic field become doubly refracting. The strength of the electro-optical effect for unit thickness of the dielectric varies directly as the square of the electric intensity. Also called Kerr electrostatic effect.

electrophoresis (chem). A movement of colloidal particles produced by the application of an electric potential.

electroplating (metal). The electrodeposition of an adherent coating upon an electrode for the purpose of securing a surface with properties or dimensions different from those of the base metal.

electropneumatic brake. An air brake which is provided with electrically controlled valves for the application and release of the brakes. The electric control is usually in addition to a complete air brake equipment to provide a more prompt and synchronized operation of the brakes

electropneumatic valve. A valve electrically operated which, when operated, will permit or prevent passage of air

electrorefining (metal) The process of electro-dissolving a metal from an impure anode and depositing it in a more pure state.

electrosmosis. The movement of fluids through porous diaphragms by the application of an electric potential.

electrostatic generator (el). A device for the production of electric charges by electrostatic action. Also called "influence machine," "static machine," "Wimshurst machine."

electrostatic instrument (el). An instrument which depends for its operation on the forces of attraction and/or repulsion between bodies charged with electricity.

electrostatics (el). That branch of science which deals with the laws of electricity at rest.

electrostenolysis (chem) The discharge of ions or colloidal particles in capillaries through the application of an electric potential

electrothermic instrument (el). An instrument which depends for its operation on the heating effect of a current. Two distinct types are (a) the expansion type, including the "hot-wire" and "hot-strip" instruments; (b) the thermo-couple type.

electrothermics. That branch of science and technology which deals with the direct transformations of electric energy and heat.

electrotropism (chem-phy). Reaction to the electric current.

electrotyping (print). The production or reproduction of printing plates by electroforming

electrowinning (metal) The electrodeposition of metals or compounds from solutions derived from ores or other materials using insoluble anodes.

element. The simplest form to which a substance may be reduced. For example: an ordinary lead pencil may be said to have four elements 1. the wooden case or shell, 2. the lead or graphite core, 3. the rubber or eraser, and 4. the metal ferrule which holds the rubber to the wooden case.

element (chem). That form of matter which cannot be decomposed by any means known to science. Examples are gold, silver, iron, helium. There are 88 known elements. See table of chemical elements

element (el) The element of a storage cell consists of the positive and negative groups with separators, assembled for one cell

elevator (aer) A movable auxiliary airfoil, the function of which is to impress a pitching moment on the aircraft. It is usually hinged to the stabilizer

elevator (bldg) A hoisting and lowering mechanism equipped with a car or platform which moves in guides in a substantially vertical direction Dumbwaiters, endless belts, conveyors, chains, buckets, etc., used for the purpose of elevating materials and tiering, piling or feeding machines giving service within one story, are not included in the term "elevator"

elevator angle (aer) The angular displacement of the elevator from its neutral position. It is positive when the trailing edge of the elevator is below the neutral position.

elliptic spring (aut) A leaf spring of either full or semi-elliptic shape.

elon (phot) A developing agent in powdery form and slightly toxic. Its chemical composition is monomethyl-para-amido-phenol-sulphite

elongation (StM) The percentage of elongation is found by dividing the increase of length after rupture by the original gage length The percentage of elongation depends on the gage length The elongation indicates the ductility of the material

em (print) The square of a type body So named because the letter M in the early fonts (and sometimes in modern fonts) was usually cast on the square body The common method of measuring type composition is by ems, the number of ems in a line being multiplied by the number of ems in the total length of the page or column. The term is applied in many ways to printing materials, as em dash —, em quad □, em set, etc.

embossing press (book) A machine used largely in bookbinderies for impressing book cover designs, etc.

emergency flotation gear (aer) A device attached to a landplane to provide buoyancy in case of an emergency landing on the water

emery An impure variety of corundum It is used principally as a polishing and abrasive agent Its common application in the machine shop is in the form of emery cloth

E.M.F (abbr) See electromotive force

empennage (aer) See airplane tail

empty weight (aer) The structure, power plant, and fixed equipment of an aircraft. Included in this fixed equipment are the water in the radiator and cooling system, all essential instruments and furnishings, fixed electric wiring for lighting, heating, etc. In the case of an aerostat, it also includes the amount of ballast that must be carried to assist in making a safe landing.

emulsion (chem) A suspension of oil-in-water or water-in-oil

emulsion (phot) A term applied to the light-sensitive coating on films, plates or paper, which is acted upon by the light rays

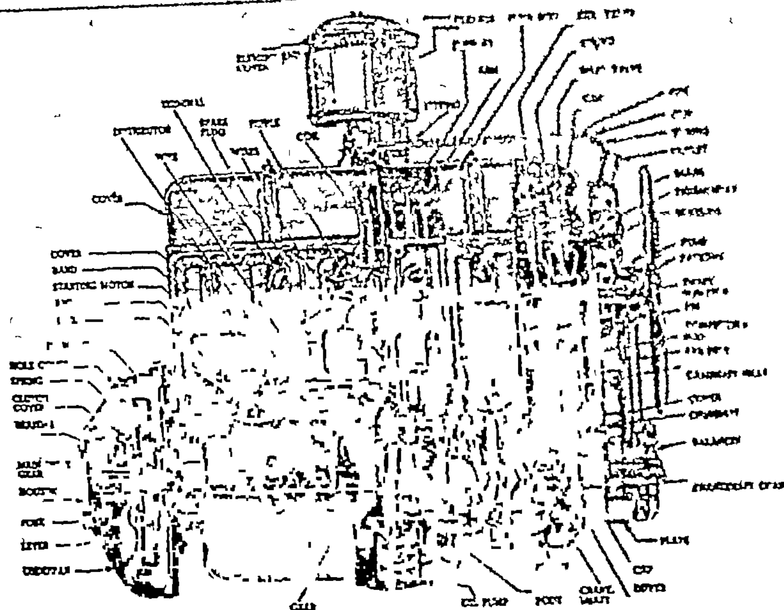
emulsoid (chem) A colloidal suspension of a liquid in another liquid Certain solids, such as gelatin, show all the properties of this class, so the term is not strictly accurate

en (print) One-half the width of an em body

enameled glass Glass which has had applied to its surface a coating of enamel The enamel may be white or colored and may have varying degrees of diffusion

enameled paper Paper with a specially prepared surface made by a coating of clay, glue, or other substance, pressed smooth by hot rollers under pressure, used for fine engraving, pamphlet covers, etc

endothermic (chem) Referring to the absorption of heat by a system or an isolated reaction



ENGINE ASSEMBLY—R. H. CROSS SECTION VIEW
(Courtesy, General Motors Corporation)

ends (text) A mill term referring to warp yarns Also, short pieces of fabrics

energy (phy) Energy of a system is measured by the amount of mechanical work which the system is capable of doing

engine (aer aut) See axial type engine, cam engine, compression ignition engine, double row radial engine, left-hand engine, right hand engine, supercharged engine See also motor

Note The term "engine" should be used rather than "motor" in automobile nomenclature, in order to avoid confusion with electric motors (SAE, nomenclature)

engine cowling (aer) A removable covering placed around all or part of an airplane engine.

engine displacement (aer) The total volume swept by the pistons of all the cylinders during one complete stroke of each piston

engineer's chain (surv). The engineer's chain is a 100-foot surveying chain. It is so called to distinguish it from the 66 foot or 100 link chain termed the "surveyor's chain" because of its special value in land surveys involving acreage (10 square chains=1 acre)

engine lubrication (aut) An oil-distributing system for engine lubrication is necessary in order to maintain a film of oil on cylinder walls, bearings, and other points where moving parts come in contact. This may be a force feed (pump pressure) type, splash type, or a combination of both. In the force feed type, oil is pumped under pressure from the crankcase through oil tubes to all crank-

shaft bearings. In a full force feed system the oil is pumped to the piston pin through the connecting rods. In the splash type, oil in the crankcase is splashed and converted into a fine mist by small devices called "dippers" located in the extreme lower end of each connecting rod bearing. Usually the oil is pumped into troughs directly under each connecting rod.

engine room (ship) The place where the engines of a ship are confined, next to the boilers

engine weight per horsepower (aer) The dry weight of an engine divided by the rated horsepower

engraver's metal (art) An alloy of tin, antimony and lead, mounted on a block similar to an electroplate, on which an engraving can be readily cut, used for color plates, tinted backgrounds, etc.

engraving 1. The art or process of making letters or designs on wood, metal, or other substances, by cutting or etching, for the purpose of printing or stamping on paper or other material. 2. An engraved plate, or an impression made from an engraved plate. 3 An engraved inscription.

entrance cone (aer) That portion of a wind tunnel from which the air flows to the experiment chamber

entropy (mech) An index of the relative amount of unavailable energy in a physico-chemical system. It is known as the thermodynamic function

envelope (aer) 1 The outer covering of an aerostat, usually of fabric. 2. The bag containing the aerostatic gas of a free balloon, kite balloon, or nonrigid airship

enzymes (chem) Definite material catalyzers of organic and usually colloid nature with specific powers of reaction, formed by living cells. Present in fermentation.

eosine (chem) A chemical obtained by the action of bromine or fluorescin, used largely as a dyestuff. In ink manufacture, one of the water soluble dyes for making pink lakes and red inks

E P (aut) See extreme pressure

equation (alg) Any formula which expresses an equality of symbols or numbers.

equation of the first degree (alg) See simple equation.

equation of the second degree (alg) See quadratic equation.

equator (nav) The great circle in which the plane of the earth's equator cuts the celestial sphere.

equilibrium (phy). 1. The property of a number of forces having their resultant equal to zero. 2 The property of a particle or body when the resultant of all forces acting on it is zero. A body is in equilibrium when it has no acceleration, either of translation or rotation; a rigid body is in equilibrium when its center of mass has no acceleration and the body has no angular acceleration. The conditions for a body to be in equilibrium are (a) that the resultant of the forces acting on it be equal to zero, (b) that the sum of the moments of these forces about every axis be equal to zero

equivalent flat-plate area (aer) The area of a square flat plate, normal to the direction of motion, which offers the same amount of resistance to motion as the body or combination of bodies under consideration.

equivalent focus (phot) The distance from the optical center of a lens to the ground glass when focused on a distant object.

equivalent monoplane (aer) A monoplane wing equivalent as to its lift and drag properties to any combination of two or more wings.

equivalent wing (stress analysis) (aer). A wing of the same span as the actual wing, but with the chord at each section reduced in proportion to the ratio of the average beam load at that section to the average beam load at the section taken as the standard.

erection (ship) The process of hoisting into place and bolting up the various parts of the ship's hull, machinery, fittings, etc.

erg (el) The metric unit of work. The work done by a force of one dyne when its point of application is moved through one centimeter in the direction of the force.

Erichsen value (StM) Index of forming qualities of sheet metal. The test is conducted by supporting the sheet on a circular ring and deforming it at the center of the ring by a spherically pointed tool. The depth of impression (or cup) in millimeters, required to obtain fracture is the Erichsen value for the metal. Erichsen standard values for trade qualities of soft metal sheets, corresponding to various sheet thicknesses, are furnished by the manufacturer of the machine.

escalator A moving inclined continuous stairway or runway used for raising or lowering passengers

estimated time of arrival (E T.A.) (air nav) The computed time that an aircraft will reach its destination or turning point.

etching 1 A method of engraving on metal, glass, or similar substance by means of lines or dots eaten in or corroded by means of strong acid. 2. A print made from an etched plate. 3 The acid treatment of a metal surface for purposes of metallographic analysis

ether (chem) Ethyl oxide, produced by the action of sulphuric acid on alcohol.

ether (met) The medium which permeates the entire space of the universe, including both the spaces between bodies and the bodies themselves

ethyl (chem) The common name for tetraethyl lead, used as an admixture to gasoline to prevent "pinking"

ethylene glycol (chem) A syrupy sweet liquid which is clear and colorless It is hygroscopic and it lowers the freezing point of water Used as a refrigerant and as an antifreeze

eucalyptus (wood) A strong durable wood producing eucalyptus oil and also used in construction

eu-colloids (chem) Colloids whose colloid-particles are identical with single molecules of a substance, if many molecules coalesce the colloids are "association colloids"

eudiometer (chem) An instrument for determining the proportions of the various gases necessary to form a given compound.

evaporation (met) A process whereby liquid water is changed into water vapor

evaporator (refrigeration) A piece of refrigerating equipment that receives the liquid refrigerant, and into which the heat passes from the thing to be refrigerated.

even folio (book) The page number of the left-hand pages, 2, 4, etc , the odd folio is the number of the right-hand page.

exchange (tp) See telephone exchange

exciter (el) An auxiliary generator which supplies energy for the field excitation of another electric machine

exhaust-collector ring (aer) A circular duct into which the exhaust gases from the cylinders of a radial engine are discharged.

exhaust pipe (aut) This pipe leads the exhaust gases from the exhaust port of the cylinder to the exhaust manifold. The same term is sometimes applied to the pipe running from the exhaust manifold to the muffler, and to the exhaust outlet of the muffler

exhaust system (aut). This system conducts the hot exhaust gases from the engine to the rear of the vehicle and discharges them into the atmosphere after the noise produced by their rapid expansion has been controlled and quieted. Exhaust noises are minimized by piping the gases through a chamber known as the muffler, which to a great extent allows the gases to expand and cool before being discharged In the

older type of mufflers a labyrinth is provided for the gas to pass through. The newer types allow the gases to pass "straight through" as they are cooled and toned by surrounding chambers

exit cone (aer) That portion of a wind tunnel into which the air flows from the experiment chamber

exograph. A radiograph produced by X-rays

expansive bit (carp) A drill with an adjustable cutting section One expansive bit takes the place of several large bits It is provided with two interchangeable cutting blades, one of which cuts holes with diameters of from 7/8 to 1 1/2 inches, the other, holes 1 1/2 to 3 inches in diameter The expansive bit has no twist, the remaining parts are similar to the auger bit.

experiment chamber (aer) The central portion of a wind tunnel, where aircraft models or other objects are tested. Also called "test chamber"

explosive rivet. A revolutionary type of rivet the end of which contains a small explosive charge It is employed in the aircraft industry for riveting in corners and narrow inside spaces inaccessible to bucking tools The fastening is done by either electrical or heat detonation which opens and spreads the end of the rivet.

exponent (alg) A number which indicates how many times its base is to be used as a factor, or a number which indicates the power to which another number is to be raised Example in x^2, 2 is the exponent of x.

exposure (phot) The period of time during which a sensitized film, plate or paper is exposed to the action of light.

exposure meter (phot) An instrument which measures the amount of light reflected by the object to be photographed and indicates the proper exposure There are generally two types the photo-electric exposure meter and the visual extinction type.

extension lines (draw) Lines which show the limits of the distance indicated by the dimension line.

extensometer (StM) An instrument for measuring the amount of stretching a material undergoes during a test for tensile strength See also proportional limit.

external aileron (aer) A separate airfoil mounted clear of the wing surfaces of an airplane but usually attached to them and deflected for lateral control

external resistance (el) The resistance of the complete electric circuit outside the cell or battery between its positive and negative terminals

extreme breadth (ship) The width of a ship, including the thickness of plates

extreme pressure (aut) (E P) Refers to a lubricant compounded to withstand the extreme pressures encountered in some present day transmission and rear axle gears

extremes (alg) The first and last terms in a proportion

eye of storm (met) The center of a storm, particularly the hurricane

eyepiece (opt) The viewing endpiece or lens of a telescope or microscope nearest to the eye of the observer, as distinguished from the objective lens

F

fabric (aer) See balloon fabric, gas cell fabric, goldbeaters skin fabric.

fabricate (ship) To shape, assemble, and secure in place the component parts in order to form a complete whole To manufacture.

fabric count (text) The number (counted units) of warp yarns (end) and filling yarns (picks) per inch, as 68 by 52, meaning 68 warp ends and 52 picks in the filling

face (print) 1 The impression surface of a type or printing plate, the part which prints as distinguished from the shoulder, shank, or base 2 A particular style or size of letter cast in type, as distinguished from another style or size plain face, bold face, light face. 3 The front or printed side of a sheet, etc.

face of cloth (text) The right side as distinguished from the wrong

face of weld The exposed surface of a weld.

facsimile transmission. The electric transmission of a graphic record having a limited number of shade values.

factor (math) Any of the numbers used in multiplying Every factor of a product is also an exact divisor of the product, i e, 5 and 8 are factors of 40

factor of safety (stress analysis) (aer) The ratio of the ultimate load to any applied load. This term usually refers to the probable minimum factor of safety, which is the ratio of the ultimate load to the probable maximum applied load.

factor of safety (StM). The ratio of the ultimate strength of a member to the maximum probable load on the member. For example, assume that a steel column under its maximum probable load is stressed 20,000 pounds per square inch cross-sectional area in compression If the column will collapse at a stress of 30,000 pounds per square inch, the factor of safety is

$$\frac{20,000}{30,000}=1\ 5$$

fading (rad) The variation of the signal intensity received at a given location from a radio transmitting station as a result of changes in the transmission media.

fading tendency (phot) Fading of a print caused by light affecting the silver salt which has not been removed from the emulsion on account of incomplete fixation

Fahrenheit. A temperature scale according to which the freezing and boiling points of water are marked 32 degrees and 212 degrees respectively. To convert Fahrenheit into centigrade, subtract 32, multiply by 5, and divide by 9

fairing (aer) An auxiliary member or structure whose primary function is to reduce the drag of the part to which it is fitted.

fairing a line (ship) Straightening lines supposed to be straight or smoothing out into a smooth curve, lines supposed to be curved

fairing wire (aer) A wire provided as a point of attachment for the outer cover or to maintain the contour lines of the envelope of an airship

fairlead (ship) A term applied to fittings or devices used in preserving the direction of a rope, chain or wire, so that it may be delivered fairly or on a straight lead to the sheave or drum, etc

fairwater (ship) A term applied to plating fitted in the shape of a frustum of a cone around the ends of shaft tubes and struts to prevent an abrupt change in the stream lines Also found at ends of [illegible]

false wing rib (aer) See former wing rib

fantail (ship) The up, aft rounded part of the stern The frames or cants are arranged like the tail of the famous breed of pigeons, fantail

farad (el) A unit of capacitance equal to the amount of capacitance present when 1 volt can store 1 coulomb of electricity A farad is one-billionth part (10^{-9}) of an abfarad.

faraday (el) The number of coulombs (96,500) required for an electrochemical reaction involving one chemical equivalent.

Faraday effect (el) See magnetic rotation.

faradmeter (el) An instrument for measuring electric capacitance. Faradmeters are provided with a scale usually graduated in microfarads

Farmer's reducer (phot) Consists of a solution of potassium ferricyanide added to a solution of sodium hyposulphite and used for the purpose of reducing the density of a negative.

fascia (bldg) A flat member of a cornice or other finish, generally the board of the cornice to which the gutter is fastened.

fast color (text) A color which is resistant to the action of light, sun, washing, or other special test or chemical.

fathom (ship) Six feet, a marine unit for measuring depth

fatigue resistance ([illegible]) Resistance of material to a load, which is applied and removed in whole or in part many times and at short intervals Fatigue resistance is a very valuable property of materials Some engine parts are subjected to a very high number of reversals of stress during the life of the machine Numerical values for fatigue resistance may be given in two ways: 1 the "strength" at which a specimen endures a definite number of cycles of stress, 2 the "endurance limit," if such exists, that is, the maximum stress which the specimen will endure for any number of repetitions

fatty acid (chem) A monobasic aliphatic acid Some restrict the usage to saturated acids Cyclic acids such as chaulmoogric acid are sometimes termed fatty acids when they occur naturally as constituents of fats

fault (el) (wire or cable) A partial or total local failure in the insulation or continuity of a conductor

fault current (el) A current that flows from one conductor to ground or to another conductor owing to an abnormal connection (including an arc) between the two A fault current flowing to ground may be called a ground fault current.

faying surface (weld) That surface of the base metal which comes in contact with another part of base metal to which it is fastened.

feather (aer) In rotary wing systems, to periodically increase and decrease the incidence of a blade or wing by oscillating the blade or wing about its span axis

feed (mach) The rate at which a cutting tool travels across the work or the work travels across the cutting tool. Measured in inches per revolution (lathe); inches per stroke (shaper); or feet per minute (milling machine)

feed back (rad) See regeneration.

feeder (el) A conductor or group of conductors connecting (a) two generating

stations, (b) two sub-stations, (c) a generating station and a sub-station or feeding point, or (d) a sub-station and a feeding point.

feeder (in interior wiring) A set of conductors originating at a main distribution center, and supplying one or more secondary distribution centers, one or more branch-circuit distribution centers, or any combination of these two types of equipment.

feel of cloth (text) The sensation produced when the cloth is touched by hand. Expressed as harsh, stiff, firm, or boardy

feldspar (min) General name for a group of rock forming minerals They occur in the United States, Norway, Sweden, Italy, Canada, and Russia. Used in ceramic glazes

felt (text) A compressed wool or wool and cotton mixture of varying quality dependent on the quality of the constituents For hard felt, wool must be used alone, as cotton does not harden in the felting or filling process In aircraft work felt is used for lining tank straps and in other places to prevent chafing as well as for installation of instruments against vibration Either felt or flannel impregnated with soybean oil can be used as a base for water and oil stops In building construction it is often used for weather stripping See also fur felt, wool felt.

felted (text). See fulled.

female die (book) In embossing, a metal plate in which the design is incised or depressed so as to correspond with the raised design on the "male die", the one fitting into the other, and both used together to produce the embossed surface on the paper or cardboard Also called "Counter Die"

fenders (ship) Portable wooden or rope sennit bumpers hung over the side during landings to protect the hull.

ferro alloy (metal). Any metallic compound of iron with an element other than carbon, e g, manganese, chromium, etc, generally used as a vehicle for introducing the element in the manufacture of steel. Spiegeleisen is an example of a ferro-alloy used for introducing manganese in the manufacture of steel.

ferrocyanide (chem) A compound of a base with ferrocyanogen (cyanogen and a form of iron) used in the making of iron-blue inks The iron blues are a mixture of the ferrocyanides and the ferricyanides of iron and potassium.

ferromagnetic material (el) A material having a permeability that varies with the magnetizing force and that is considerably greater than the permeability of a vacuum.

ferrotype plate (phot) A highly polished plate, either enameled or chromium plated sheet metal, used for obtaining a high gloss on prints by drying the print with its face or emulsion side in contact with the plate

ferrotyping (phot) A process for increasing the luster of a glossy surfaced print by drying it face down on a ferrotype plate. Also called glazing

F-head (aut) Used to describe an engine with one set of valves (usually intake) placed overhead and the other (usually exhaust) in the side of the cylinder block.

f hp (aut) Friction horsepower

fiber (paper) A filament or plant cell largely composed of cellulose, the basic element of paper-making material

fiberglass Trade name for a special glass which is obtained by means of a mechanical process in which the glass is reduced to a flexible thread or filament which can be woven into cloth of various kinds.

fichtelite (chem) A highly stable saturated dimethyl isopropyl anthracene, found in peat and lignite.

fidelity (rad) The degree to which a system, or a portion of a system accurately reproduces at its output the form of the signal which is impressed upon its input.

fidley deck (ship) A partially raised deck over the engine and boiler rooms, always around the smokestack.

field coil (el) A suitably insulated winding to be mounted on a field pole to magnetize it.

field elevation pressure (air nav) The existing atmospheric pressure at a point ten feet above the main elevation of the runway It is obtained by applying a suitable correction to the station pressure It is assumed that the altimeter in an airplane is ten feet higher than the landing surface.

field handling frame (aer) A portable frame which may be attached to an airship when it is on the ground and which is intended to provide a hold for more men than could grasp the handling rails of the cars

filament (rad) A cathode of a thermionic tube, usually in the form of a wire or ribbon, to which heat may be supplied by passing current through it.

filament (text) A variety of fiber (silk or rayon) characterized by indefinite length

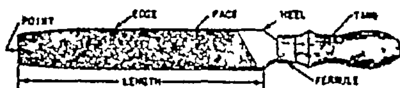
filament power supply (rad) The filament power supply for a thermionic vacuum tube is the means for supplying and delivering power with proper regulation to the filament for the heating of the filament. This term is also applied to the means for supplying power to the heaters of tubes of the unipotential cathode type.

filiform (bot) Capillary, thread-like

filigree. Specifically, delicate jewelry resembling lacework made of twined gold or silver wires, ornamented with beads or bits of metal, hence in a general sense, any fanciful ornamental openwork in carving, tracery, printing, etc., regarded as trivial, fragile, or unserviceable

filing block (mach) A piece of hard, close-grained wood having grooves of varying sizes upon one or more of its sides. Used for holding small rods, pins, etc., in the jaws of the vise while being filed.

PARTS OF A FILE



Parts of a File

Also a block of zinc, copper, or other fairly soft metal as one of a pair of "protectors" placed between the vise jaws to prevent work becoming damaged while being held for filing

filler metal (weld) Metal to be added in making a weld.

fillet (mach) A concave or dish-shaped junction formed where two surfaces meet.

fillet weld. A weld of approximately triangular cross section, as used in a lap joint, tee joint or corner joint joining two surfaces approximately at right angles to each other

filling (text) 1 Yarn running from selvage to selvage at right angles to the warp in a woven fabric. 2. Yarn used as filling in weaving 3 Used as a collective term for nonfibrous material added to a fabric to increase weight or to fill interstices in coarse or loosely woven cloth

film pack (phot) A magazine consisting generally of twelve films and used with cameras having a ground-glass focusing screen. The twelve films are separated from each other by sheets of black paper Paper tabs project from the pack and, when one of these is pulled out, it will transfer a film from the front to the back of the pack, leaving the next film in place for a new picture

film-pack adapter (phot) A mechanism locked to the back of a plate camera and permitting the use of cut film instead of plates

filter (phot) See light filter

filter (rad) A selective circuit network, designed to pass currents within a continuous band or bands of frequencies or direct current, and substantially reduce the amplitude of currents of undesired frequencies

filter (radiography) A sheet or strips on edge (which may be oscillated) of absorptive material placed between the film and the object being radiographed, to reduce the effect of secondary and scattered radiation

filter factor (phot) The number of times the exposure must be increased when using a filter as compared with the exposure necessary without the filter

filter lens (weld) A colored glass used in goggles, helmets and shields to exclude harmful light rays.

filter paper (paper) An unsized porous paper, used for filtering purposes in laboratories

filter pass band (rad) See filter transmission band.

filter transmission band (rad) (filter pass band) A frequency band of free transmission, that is, a frequency band in which, if the filter is non-dissipative or dissipation is neglected, the attentuation constant is zero

filtrate (chem) A solution separated by filtration.

fin (aer) A fixed or adjustable airfoil, attached to an aircraft approximately parallel to the plane of symmetry, to afford directional stability; for example, tail fin, skid fin, etc

fin (weld) See flash

final drive (aut) That part of a power transmission system between the propeller shaft and the differential. Since power is transmitted to the axle at right angles, it is necessary to change its direction of movement. This is accomplished by bevel gear drives, spiral bevel gears, or worm gears The worm gear type of drive is occasionally used in the heavy duty trucks because of its high gear reduction Straight spur gearing is seldom used except in the case of a double reduction drive where a combined bevel and spur gear unit is used A dual ratio is provided by a system of planetary or spur gears between the final drive gear and the differential case.

fin carrier (aer) A frame to which the inboard edge of the fin of a nonrigid or semirigid airship is attached, so as to prevent the edge of the fin from sinking into the envelope.

finder (phot) A sighting device used to point the camera correctly and compose the picture It may consist of a thin metal or wire frame, small negative lenses mounted either inside or outside the camera, etc.

fine-grain (phot) Applied to the emulsion of a negative material. The silver particles are unusually minute and evenly distributed. Such negatives yield big enlargements having contact print quality.

fineness ratio (aer) The ratio of the length to the maximum diameter of a streamline body, as an airship hull.

finger patch (aer) A special form of patch having "fingers" extending from the central portion to distribute the load more widely to the fabric of an envelope or gas cell.

fingers (print) The grippers on a press which hold the sheet when printing

finishing laboratory (phot) A photographic workshop where such operations as drying, spotting, retouching, toning, and mounting are performed.

firebrick (foundry) A refractory brick used to line furnaces and made of fireclay

fire opal. See opalescent glass.

fished joint (carp) An end butt splice strengthened by pieces nailed on the sides

fishing wire (el) See snake.

fishtail (aer) A colloquial term describing the motion made when the tail of an airplane is swung from side to side to reduce speed in approaching the ground for a landing

fit (mech) Fit may be considered as the desired clearance between the surfaces of machined parts

fits (aut) As applied to automotive maintainance may be considered as "drive", "press", or "force", fits, where some external force may be used. Examples hammering or sledging for a "drive" fit, use of an arbor press to make a "press fit" A "hand" fit is made by the pressure exerted by a man's hand, usually the palm (or heel)

fitting (aer) A generic term for any small part used in the structure of an airplane or airship If without qualification, a metal part is usually understood. It may refer to other parts, such as fabric fittings

fitting (el) An accessory (such as a locknut or bushing) to a wiring system which is intended primarily to perform a mechanical rather than an electrical function.

fix (air nav) The intersection of two or more lines of position or bearings A fix is indicated on a map or chart by a dot or cross centered in a circle

fixation (phot) See fixing

fixed (text) A term used in dyeing or printing when the colors are made permanent, or fast.

fixed focus (phot) A feature of most inexpensive box cameras in which no provision is made for focusing The position of the lens is fixed so that all objects beyond about eight feet from the camera will be sharply defined.

fixed gage (mach) A gage made with extreme accuracy to some fixed standard of measurement or shape, so that when it is applied to a piece of work, the standard is transferred to the work. Fixed gages are generally made either individually or in sets of two or more, for some specific operation, or for transferring some particular measurement, such as gaging thickness, threads, diameters, depths, etc.

fixed light (aer) A light which is constant in luminous intensity with respect to both time and direction.

fixed weight (airship). The weight of the machinery and all equipment and parts that are fixed in position and non-consumable Liquids in the cooling systems of the engines are included.

fixed power plant weight (for a given airplane weight) The weight of the power plant and its accessories, exclusive of fuel and oil and their tanks

fixing (phot) The process of removing the unactivated silver salts from a negative or print, usually by immersing in a solution of hypo

fixture stud (el) A fitting used to mount a lighting fixture in an outlet box. The stud is fastened to the box and the fixture is fastened to the stud by a hickey

flange (ship) The turned edge of a shape or plate, which acts to resist bending strain

flannel (text) A soft, lightweight wool, cotton, or wool and cotton fabric slightly napped either on face or back, or both. In white, plain, or mixed colors. Used for men's shirts, sport trousers, dresses, underwear, and children's clothes

flannelette (text) A lightweight cotton material napped on the face May be white, dyed, or printed.

flap (aer) A hinged or pivoted airfoil forming the rear portion of an airfoil, used to vary the effective camber

flapping angle (aer) The difference between the coning angle and the instantaneous angle of the span axis of a blade of a rotary wing system relative to the plane perpendicular to the axis of rotation.

flare (aer) A pyrotechnic device designed to produce either a luminous signal or illumination. See parachute flare, signal flare, wing-tip flare

flare (ship) The spreading out from the central vertical plane of the bore-body of a ship with increasing rapidity as the section rises from the water line to the rail

flare spot (phot) A circular patch of light in the center of the image caused by a defect in the lens

flash (weld). Metal and oxide expelled from a joint made by a resistance welding process

flashback (weld) A recession of the flame into or back of the mixing chamber of the torch.

flash butt welding A resistance butt welding process wherein the necessary heat is derived from an arc or series of arcs established between the parts being welded prior to the application of the weld consummating pressure which is applied when the heat thus obtained has produced proper welding conditions.

flasher (el) A device for rapidly and automatically lighting and extinguishing electric lamps

flashing (carp) The material used and the process of making watertight the roof inter-sections and other exposed places on the outside of the house.

flashing light (aer) An intermittent light in which the light interval is shorter than the dark interval. Any light which is intermittent as viewed from a single direction

flashover (el) A disruptive discharge around or over the surface of a solid or liquid insulator.

flash point (chem). The temperature of a liquid fuel, below the ignition point, at which it gives off a combustible vapor

flask (foundry) 1 The wood or metal box holding the sand of a casting mold. 2. A metal cylinder for holding compressed oxygen or some other gas.

flat (phot) Lack of vigor or contrast in a negative or print

flat (ship) 1 A walking surface in the engineroom or any special platform, such as the coxswain's flat. 2. A term applied to a partial deck built without any camber

flat bed (print) Said of a press having the printing form on a plane surface, in distinction from one having a curved printing surface.

flat keel (ship) The bottom center line plate of the ship

flat knit (text) A fabric knit on a spring board needle knitting machine, flat on the back and showing small ribs on the face It lacks the elasticity of latch needle rib knit fabric. Also called "plain knit"

flatness of field (phot) That quality in a lens affording sharp impressions at both center and edge of negative

flat position (of welding) A position of welding in which filler metal is deposited from the upper side of the joint and the face of the weld is approximately horizontal.

flat spin (aer) A spin in which the longitudinal axis is less than 45 degrees from the horizontal

flexible binding (book) Said of a book which is sewed on raised bands and the sewing threads passed entirely around each band, thereby making a flexible back.

flexible materials (StM) Those which have a low modulus of elasticity They can be deformed considerably by bending, twisting, etc., within the elastic limit of the material.

flexible metal conduit (el) A flexible raceway of circular cross-section specially constructed for the purpose of permitting drawing in or withdrawing of wires and cables after the conduit and its fittings are in place. It is made of metal strip, usually of steel with metallic corrosion-resistant coating, helically wound and with interlocking edges

flight path (aer) The flight path of the center of gravity of an aircraft with reference to the earth, or with reference to a frame fixed relative to the air

flight-path angle (aer) The angle between the flight path of the aircraft and the horizontal.

flint. A form of natural silica or quartz which is brownish black-gray in color It comes in crystalline or lump form. Used in the manufacture of porcelain pottery and enamel-ware. Also called silex.

flint glass (opt) See glass.

flitters (print) Fine bits of tin, brass, and the like, used in decorating Christmas cards and other work, to give effects of spangles, frost, etc. Flitters are dusted on a sizing, which is either printed or put on with a brush, as for bronze powders

float (aer) A completely enclosed, watertight structure attached to an aircraft to give it buoyancy and stability when in contact with water

float (aut) A small disk or ball-shaped object made of cork or light, hollow metal, and floating on the surface of the gasoline inside the mixing chamber of a carburetor The float prevents the gasoline from overflowing and running out of the spray nozzle when the engine is not running

float (mach) Sometimes used to refer to the coarser grades of single-cut files when cut for very soft metals (like lead) or for wood

float (text) 1 Woven fabric The portion of a warp or filling yarn that extends unbound over two or more filling or warp yarns 2 Defect: The portion of a warp or filling yarn that extends unbound over yarn with which it should be interlaced.

floating aileron linkage arrangement (aer) See aileron linkage arrangements.

floating neutral (el) One whose voltage to ground is free to vary when circuit conditions change.

float or hull displacement (aer) The total volume, or total weight, of water displaced by a seaplane float or hull.

float system (aer) The complete system of permanent floats, used to give buoyancy and stability to a seaplane or flying boat while it is at rest on the water, and to provide hydrodynamic lift while it is taking off

flocks (text) The short fibers of wool that are clipped from the surface in the finishing process Used to increase weight of low grade woolens May be blown in during the fulling operation to make a more solid fabric Also made by flock grinding machines in shoddy mills.

flong (paper) A prepared sheet of soft thick composite paper used for making matrices for stereotypes

floor (ship) A plate placed vertically in the bottom of a ship on every frame and running athwartship, from bilge to bilge.

flooring (bridges) The deck covering which forms a roadway for traffic across a bridge.

floor pi (print). Type dropped on the floor and left there by careless compositors

floors (ship) Transverse timbers which reinforce the frames and carry the strength athwartships across the keel

flotation gear (aer) See emergency flotation gear

flotation process (metal-min) A concentration process that takes advantage of the principles of surface tension and colloid chemistry, with whatever allied principles may be involved, to separate mineral from gangue by means of floating it upon the surface of water or other solutions, while the gangue is induced to sink through the surface and settle separately The process or processes by which the valuable minerals in a mass of finely ground ore can be caused to float on a liquid into which the finely ground ore is fed. Classified as film flotation and froth flotation

flue. The opening in a furnace chimney through which smoke passes

fluid drive (aut) The principal purpose of fluid drive is to eliminate torsional vibration and all jerks resulting from use of the clutch and shifting gears, thereby giving a smooth flow of power from the engine to the wheels. Fluid drive consists of a centrifugal pump or impeller driven by the engine, and a runner or turbine mounted on the driven shaft. There is no metallic connection between them When the crankshaft and impeller rotate oil is driven by centrifugal force from the center to the outside edge

of the impeller between the vanes. This increases the velocity and the energy of the oil which then enters the runner vanes at the outside and flows toward the center imparting a rotating motion to the runner The principle of fluid drive is embodied in hydramatic transmission.

fluorescence (phy) The re-emission of radiant energy at a longer wavelength than that of the illumination.

fluorescent lamp (el) An electric discharge lamp in which the radiant energy from the electric discharge is transferred by suitable materials (phosphors) into wave-lengths giving higher luminosity

fluorescent screen (el) A sheet of suitable material coated with a substance which fluoresces visibly when Roentgen rays, radium rays or electrons impinge upon it.

fluoroscope (el) A device consisting of a fluorescent screen suitably mounted either separately or in conjunction with an x-ray tube, by means of which x-ray shadows of objects between the tube and the screen are made visible.

fluorspar (chem) Calcium fluoride (CaF_2), used as a flux in metal smelting

flush (carp) Adjacent surfaces even, or in the same plane (with reference to two structural pieces)

flush deck (ship) A deck whose top side is flush.

flush head rivet (ship) A rivet, the head of which does not extend above the surface of the plate, angle bar, etc., in which it is driven.

flush weld. A weld made with a minimum reinforcement.

flutter (aer) An oscillation of definite period but unstable character set up in any part of an aircraft by a momentary disturbance, and maintained by a combination of the aerodynamic, inertial, and elastic characteristics of the member itself (cf buffeting)

flux (metal) A substance used to facilitate the smelting of metals and the removal of impurities from them Examples are limestone, fluorspar (calcium fluoride), etc.

flux (print) Any substance, like borax, rosin, etc., used to promote the fusion of metals. A compound put into metal in the furnace of a Linotype, Monotype, or other casting machine, to clean the metal and bring the dross to the top, a combination of tallow, charcoal, rosin, sal ammoniac, etc.

flux (in furnaces) Material capable of forming with gangue or other earthy matter a liquid melt having the fusibility and chemical character suitable to a specified furnace process.

flux (weld) A fusible material or gas used to dissolve and prevent the formation of oxides, nitrides or other undesirable inclusions formed in welding

flying boat (aer) A form of seaplane whose main body or hull provides flotation.

flying wire (aer) See lift wire.

flywheel (aut) A heavy-rimmed wheel attached to the rear end of the crankshaft. Its centrifugal force contributes to the smooth operation of the engine.

Foamglas. Trade name for a glass product which is utterly unlike ordinary glass. Although it is a true glass, it is black in color, opaque, floats on water, is much lighter than ordinary glass, more buoyant than cork, and can be sawed, drilled or shaped without chipping or shattering This glass is made by mixing a little carbon with ordinary glass and heating to the proper temperature. At this temperature gas is formed which bubbles through the glass and puffs it up, causing it to become full of tiny, non-connecting air cells much like foam rubber A block of Foamglas may be compared to a mass of tiny sealed air chambers. Used for insulated refrigerated storage rooms and equipment. Replaces cork, balsa wood, cellular rubber, and kapok as filler for life preservers and rafts.

Foamite (chem) The trade name for a preparation used in smothering oil fires. A proprietary concentrated extract of licorice root. When mixed with a bicarbonate of soda solution in proper proportion, it yields a solution containing an equivalent acid radical, and produces a mass of foam impregnated with carbonic acid gas

focal length (phot) The distance the lens must be placed from the film in order that the projected image of an object at infinity may be in focus on the film.

focal-plane shutter (phot) A shutter which operates near the film, which is the focal plane of the lens. It consists of a curtain with a number of slits in it of different widths The amount of exposure is controlled by varying the speed at which the slit passes in front of the film and by using slits of different widths

focus (phot) The point at which converging rays of light from a lens meet, forming an image. A picture is said to be "in focus" when all details of the image are sharp and well defined.

focus-film distance (radiography) The distance in inches between the focal spot of the X-ray or the radium capsule and the film.

focusing cam (phot) See variable cam.

focusing cloth (phot). A black, generally rubberized material which is placed over the head when focusing and composing a picture on the screen. Its purpose is to shut out as much extraneous light as possible, thus permitting the image to be clearly seen and studied.

focusing scale (phot) A graduated scale for different distances which permits focusing for any given distance without using a ground glass screen.

focusing screen (phot) A sheet of ground glass on which the image is focused and composed before exposure.

foil. A metallic substance formed into very thin sheets by rolling and hammering, as gold foil (or leaf), tin-foil, lead-foil, Dutch-foil, etc. Imported patent foils, substitutes for genuine metal leaf, are made in a variety of colors and largely used for stamping book covers, for window signs, lettering, and decorating, on cardboard, cloth, leather, silk, and other materials

folio (book) A sheet folded once, consisting of two leaves or four pages, formerly understood as a sheet approximately 18 x 24 inches, giving a leaf about 18 x 12 inches, making a book of large size. In modern usage the size of the sheet in book paper is variable, the term meaning any work composed of a sheet folded once, like a folio newspaper, having four pages.

font (print) A complete assortment of types of one size and face, containing a due proportion of each letter, large and small, points, figures, etc.

foot-candle (ft-c) The unit of illumination when the foot is taken as the unit of length It is the illumination on a surface one square foot in area on which there is a uniformly distributed flux of one lumen, or the illumination produced at a surface all points of which are at a distance of one foot from a uniform point source of one candle

footing (engr) The arrangement whereby loads from supports or bridge seats are distributed over a greater ground area as a means of reducing unit areas

footing courses (bldg) The bottom and heaviest courses of a piece of masonry

footings (engr) Structures set in the ground to support the bases of towers, poles or other overhead structures Footings are usually skeleton steel pyramids, grills, or piers of concrete Also called foundations

foot lambert (ft-L) A unit of brightness equal to $1/\pi$ candle per square foot, or to the uniform brightness of a perfectly diffusing surface emitting or reflecting light at the rate of one lumen per square foot, or to the average brightness of any surface emitting or reflecting light at that rate. The average brightness of any reflecting surface in foot-lamberts is therefore the product of the illumina-

tion in foot-candles by the reflection factor of the surface. The foot-lambert is the same as the "apparent foot-candle"

footlings (ship) Bottom boards or walking flats attached to the insides of the frames on boats where deep floors are not fitted.

foot-pound (phy) A unit of work, the work done when a body weighing one pound is lifted one foot. This unit varies with the latitude and the distance from sea level. See horsepower

foot switch (el) A switch actuated by pressure of the foot, thus leaving the hands free for other operations.

force (phy) A force is any physical cause which is capable of modifying the motion of a body The vector sum of the forces acting on a body at rest or in uniform rectilinear motion is zero

force fit. See fits

forcing (phot) Attempting to bring out detail in an underexposed film, plate or print by prolonged development or by the addition of an accelerator

fore (ship) Toward the stem or front. Between the stem and amidships

fore and aft (ship). In line with the ship's keel, fore and aft deck line girders.

forebody (ship) That part from the amidships to the front of stem.

forecastle (ship) Crew's quarters on the forward part of the ship generally below the main deck on cargo ships and above the main deck in tankers

forecastle deck (ship) A partial deck at bow of ship, raised above weather deck.

forehand welding A gas welding technique wherein the flame is directed toward the progress of welding

forepeak (ship) The narrow extremity of a vessel's bow Also the hold space within it.

forepeak bulkhead (ship) The bulkhead farthest forward, generally called the collision bulkhead.

fore rake (ship) The forward part of the bow which overhangs the keel.

foresheets (nav) The portion of the boat forward of the foremast athwart.

forge (metal) 1 To work metal with a hammer or hydraulic press. 2. A steam hammer or power hammer which forges metal. 3 A furnace for heating metal to be hammered or forged in the forge shop.

forgeman (metal) One who forges heavy metal parts, such as axles and crankshafts, with a drophammer Often called a "hammerman"

forge welding (blacksmith, roll, hammer) A group of pressure welding processes wherein the parts to be welded are brought to suitable temperature by means of external heating and the weld is consummated by pressure or blows

forging thermit (weld) A thermit mixture with the addition of carbon, manganese, nickel and mild steel.

form (print) A page or number of pages, engravings, or lines or type locked in a chase ready for printing or molding

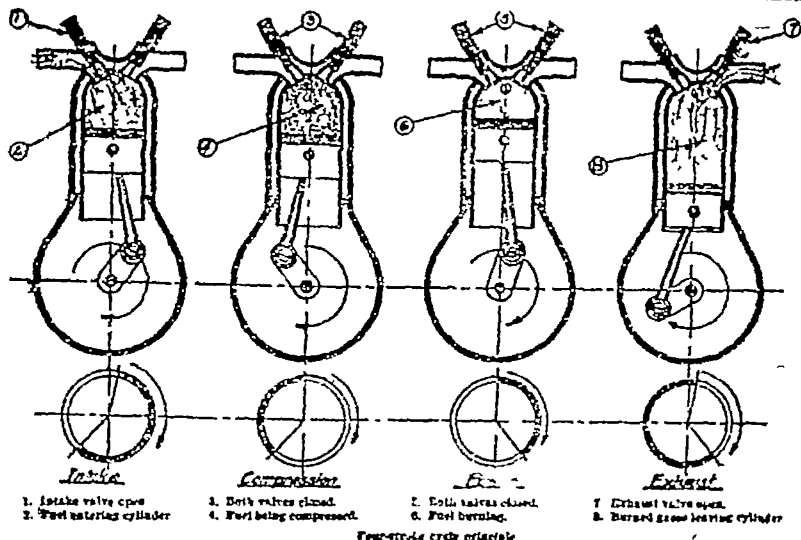
former wing rib (aer) An incomplete rib, frequently consisting only of a strip of wood extending from the leading edge to the front spar, which is used to assist in maintaining the form of the wing where the curvature of the airfoil section is sharpest Also called false wing rib

formula (math) Any rule of computation expressed by means of letters and numbers connected by signs which indicate the mathematical operations to be performed.

forward (ship) See fore.

forward perpendicular (ship) A vertical line perpendicular to the base line at a point designated by the naval architect. Usually frames start numbering from the forward perpendicular, which is the zero frame

Foucault currents (el) See eddy currents.



Four-stroke cycle principle

Foucault's pendulum (phy) A pendulum with a very long wire and a heavy bob, designed to exhibit the revolution of the earth about its axis. It is supported so as not to be restricted to remain in the same plane relative to the earth.

foundation (bldg). That part of a building or wall which supports the superstructure.

foundation plate (ship) A plate to which an engine or pump, etc., is bolted. A plate forming part of a foundation

foundry (metal) A shop where metals are melted down and cast into molds

foundry file. A file used on castings formed from foundry molds

four-cycle engine (aut) This type of engine operates on the principle of four strokes to a cycle, or four-stroke cycle. The four strokes are 1 suction stroke, 2. compression stroke, 3. power stroke, 4 exhaust stroke.

Fourdrinier machine (paper) A paper-making machine, named after the brothers Fourdrinier, French stationers in England, who, in 1804 or 1806, improved the original invention of Louis Robert, Frenchman, made in 1799 Its four principal portions are 1 the wet end containing the flow box on which the watery pulp flows, the wire screen, the deckle, suction boxes, and dandy roll, 2. the presses—a series of revolving rolls covered with felt, 3 dryers, rolls equipped with felts and heated, 4 winding end (dry end) containing calenders, winding felts, cutters, etc

four-stroke cycle (aut) See four-cycle engine

four-wire circuit (tg tp) A circuit using two lines of channels so arranged that the electric waves are transmitted in one direction only by one line or channel and in the other direction only by the other line or channel.

f p m (mach) (abbr) Feet per minute Circumferential peripheral, or linear speed in feet per minute.

fractional distillation (chem) The separation of liquids having different boiling points. An operation for separating a

mixture of two or more liquids which have different boiling points. Used extensively in petroleum distillation.

fractionation (fuels) Separation by successive operations, each removing from a liquid some proportion of one of the substances The operation may be one of precipitation, or of crystallization, or of distillation.

frame (aut) A metal support for the body, power unit, and running gear, the backbone structure around which the vehicle is assembled.

frame (carp) The surrounding or inclosing woodwork of windows doors etc., and the timber skeleton of a building

frame 1 (moving pictures) A single image area on the strip of film In taking and in projection, the number of frames per second is 16 for silent pictures and 24 for sound pictures. 2 (television) A single complete picture

frame angle bars (ship) The angle bars of which a frame of any kind is constructed.

frame frequency (television) The number of times per second that the picture area is completely scanned.

frame head (ship) The section of a frame that rises above the deck line.

frame lines (ship) The lines of a vessel as laid out on the mold loft door showing the form and position of the frames

frame mold (ship) A template for the frame of a ship.

frames (ship) The ribs of the boat, curved timbers, frequently steam bent, secured to the keel and extending upward to the gunwale or deck

frame spacing (ship) The distance between frames.

framing (carp) The rough timber structure of a building, including interior and exterior walls, floor, roof, and ceilings

framing (television) The adjustment of the picture to a desired position with respect to the field of view, generally a central position

framing square (carp) Also called steel square. An all-steel tool consisting of two arms which form a right angle The larger arm, usually 24 inches long and 2 inches wide, is called the blade. The smaller arm, usually 1 and ½ inches wide and from 14 to 18 inches long, is called the tongue The points of juncture (inside and outside) are called, individually, the heel The face of the square is that side which carries the manufacturer's name, or when holding the blade in the left hand, tongue in the right heel pointed away from the body, the face is the side which is up The reverse side is called the back.

frapping (rigging) Drawing together of several turns by passing a rope around all the turns.

Fraunhofer lines (phy) Fine black lines dividing the various bands of color in the solar spectrum

freaks (phot) A print defect in which the image develops irregularly and appears to be covered with streaks and spots It is generally due to the action of an incorrect developer

free balloon (aer) A balloon, usually spherical, whose ascent and descent may be controlled by releasing ballast or gas and whose direction of flight is determined by the wind.

free balloon concentration ring (aer). A ring to which are attached the ropes suspending the basket and to which the net is also secured Sometimes called "load ring"

free-balloon net (aer) A rigging made of ropes and twine shaped to fit the upper surface of the envelope, which supports the weight of the basket, etc., and distributes the load over the entire upper surface of the envelope

free bend test (StM) A bending test wherein the specimen is bent without constraint of a jig.

freeboard 1. (nav) That portion of a vessel out of water 2. (ship) The distance from the water line to the top of the bulwark. measured amidships

free energy (phy) That portion of the total energy content of a system which is available for doing work. All forms of potential energy (mechanical, electrical, and chemical) constitute free energy in the presence of appropriate structural arrangements Heat is convertible into work only in a fraction dependent on the difference of temperatures between which it is transferred, being completely convertible only with an infinite temperature drop

freeing port (ship) An opening in the bulwark or rail for discharging large quantities of water, when thrown by the sea upon the ship's deck. Some ships have what they call "swing gates" which allow water to drain off but which automatically close from the pressure of sea water

free oscillation (el) The free oscillation of a system is the oscillation of some physical quantity connected with the system under the influence either of internal forces or of a constant force having its origin outside the system, or of both.

free running speed. The free running speed of a vehicle or train is the speed at which the total tractive effort is exactly balanced by those forces which resist vehicle or train movements. This is usually assumed to be on level tangent track in still air, with full power applied. Also called "balancing speed".

freeze (aut) To stick by reason of expansion usually caused by heat, corrosion, or rust. Sometimes called "seize"

French curve (draw) Used to draw a smooth curve which is not a true circle or an arc thereof Points are first determined to locate the curve which is to be drawn, and the irregular curve fitted to match these points. When drawing the curve, successive sections are blended into one another to form a smooth continuous outline.

frequency band (rad). A continuous range of frequencies extending between two limiting frequencies

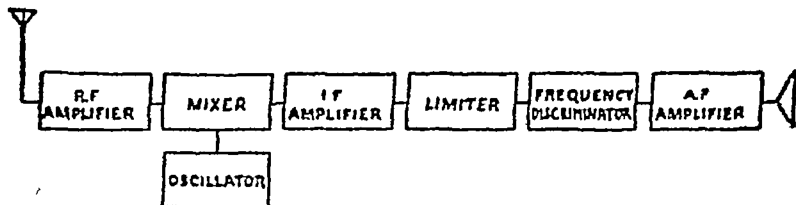
frequency changer (el) A machine which converts the power of an alternating-current system from one frequency to another, with or without a change in the number of phases, or in the voltage.

frequency converter (el) A frequency changer in which the windings carrying the currents of different frequency are in the same magnetic field.

frequency distortion (rad) That form of distortion in which the change is in the relative magnitudes of the different frequency components of a wave, provided that the change is not caused by non-linear distortion.

frequency meter (el) An instrument for measuring the frequency of an alternating current.

frequency modulation (rad) Frequency modulation is the process of varying the frequency of a radio-frequency wave at an audio-frequency rate, without varying its amplitude. The essential difference between frequency modulation (f m) and amplitude modulation (a.m.) is that in an amplitude modulated wave, during the modulation period, the ampli-



Block diagram of f m receiver

tude rises and falls in accordance with an impressed audio-frequency signal, whereas in a frequency modulated wave, during the modulation period, the frequency increases and decreases in accordance with the audio signal, but the amplitude remains constant. Frequency modulation presents an appreciable signal-to-noise ratio improvement over amplitude modulation provided the frequency swing with modulation is several times as much as the highest audio frequency transmitted.

frequency regulator (el) A regulator which functions to maintain the frequency of a generator at a predetermined value or to vary it according to a predetermined plan.

freshen the nip (nav) To set up again, to veer on the cable or pull upon a backstay to shift the chafe from a particular spot.

friction (phy) The action between two bodies at the surfaces of contact which opposes their movement.

friction horsepower (f hp) The horsepower consumed by the engine in turning itself, the friction losses within the engine.

friction tape (el) A cotton tape impregnated with a sticky, moisture-repellent compound.

frilling (phot) The puckering up and detachment of the emulsion from the support around the edges It happens oftenest in hot weather or through too much alkali in the developer

frise aileron (aer) An aileron having the nose portion projecting ahead of the hinge axis, the lower surface being in line with the lower surface of the wing When the trailing edge of the aileron is raised, the nose portion protrudes below the lower surface of the wing, increasing the drag

front (met) A zone of separation between two airmasses whose winds blow counter-clockwise in relation to the frontal zone.

frontogenesis (met) Processes active in the generation of a frontal zone.

frontolysis (met) Processes active in dissolving a frontal zone.

fuchsine (chem) A dyestuff produced by oxidation of a mixture of aniline and toluidines. It is a metallic green superficially, but yields a brilliant dark red when dissolved. Fuchsine consists essentially of salts (usually hydrochlorides or acetates) of rosaniline and pararosaniline. It is a water soluble dye used in the manufacture of printing inks

fuel bypass regulator (aer) A device placed in the fuel line of a supercharged engine for regulating the fuel pressure in the carburetor float chamber so that it will be a fixed amount above the carburetor air pressure

fuel dope (aer) Any material added to the fuel in small quantities for the purpose of preventing detonation.

fuel injector method (aut) In the Diesel engine the fuel is sprayed into the cylinder by a fuel injector.

fuel pump method (aut) In most modern vehicles the fuel is transferred from the fuel tank to the engine by a fuel pump. Starting from the storage tank the fuel passes through fuel lines or tubes, through a filter and fuel pump to the carburetor, where it is mixed with air and passed through the inlet port into the cylinder

fuel system (aut) Mechanical equipment and devices used on a motor vehicle to store fuel and deliver it to the engine as required

fuel-tank vent (aer) A small tube used to conduct surplus fuel from a fuel tank, overboard clear of the airplane, and to equalize pressures.

fulcrum (mech) The support, as a wedge-shaped piece or a hinge, about which a lever turns.

full and by (nav) With the sails as close to the wind as possible and yet filled with wind This occurs when close-hauled.

full due (nav) To secure permanently, secure for a full due.

fulled (text) A term used to describe a process in the manufacture of wool materials whereby they are reduced in width and length Also called "milled" "felted", and "fulling"

fuller (metal). A tool used in the forge shop for the purpose of hammering down bars. It has a curved face and a shank which fits into the socket of an anvil.

fuller's earth (chem) A clay relatively high in magnesia and found generally in the southern part of the United States Used as a filtering medium, rubber filler, and in the bleaching and cleansing of cloth.

full-fashioned (text) Hose or other garments shaped in the knitting Selvage joined in seams Hose requires a second machine to complete the foot. Costs more, but holds its shape and fits better than seamless hose.

full fillet weld. A fillet weld whose size is equal to the thickness of the thinner member joined

full-floating axle (aut) Same as three-quarter floating axle except that each wheel has two bearings and does not depend on shaft for alignment. The wheel may be driven by a flange or a jaw clutch. The full-floating axle shaft is relieved from all strains except torsion and, in one possible construction, tension and compression.

full frame (carp) The old-fashioned mortised and-tenoned frame, in which every joint was mortised and tenoned. Rarely used at the present time

fulling (text) See fulled.

full load (aer) Weight empty plus useful load, also called "gross weight."

full track vehicle (aut) One which is entirely supported, driven, and steered by a track which replaces all wheels.

full-wave rectifier (rad) A double-element rectifier arranged so that current is allowed to pass in the same direction to the load circuit during each half cycle of the alternating-current supply, one element functioning during one-half cycle and the other during the next half cycle, and so on.

fundamental frequency (rad) The lowest component frequency of a periodic quantity

fundamental harmonic (el) The fundamental harmonic of a periodic quantity is the harmonic component having the lowest frequency

funnel (ship) A large sheet iron tube, extending from the uptake high above the deck, through which the smoke and gases pass.

fur felt (text) A material made from the fur of rabbits, which is blown, matted, and pressed together to form a firm, durable material. Used principally in the manufacture of hats.

furl (nav) To roll up snugly and secure, as a sail or awning

furnace brazing (weld) A brazing process wherein the heat is obtained from a furnace See also brazing

furnaced plate (ship) A plate that requires heating in order to shape it as required.

furniture (print) In printing office parlance this term is used to mean pieces of wood or metal designed to fill large spaces, between pages, and around type forms when locked in a chase.

furring (carp) Narrow strips of board nailed upon the walls and ceilings to form a straight surface upon which to lay the laths or other finish.

fuse (el) An overcurrent protective device with a circuit-opening fusible member directly heated and destroyed by the passage of overcurrent through it.

fuse clips (el) The contacts on the fuse support for connecting the fuse holder into the circuit. Also called "fuse contacts"

fused quartz. A quartz manufactured from pure rock crystals. In this state it is

readily shaped. A temperature of about 1800 degrees C. is required before fused quartz becomes plastic. In this state it may be shaped into any form that is desired in glass. Because of its valuable properties, fused quartz ware has replaced porcelain, glass, various metals, and even platinum in some instances.

fuselage (aer) The body, of approximately streamline form, to which the wings and tail unit of an airplane are attached.

fuse link (el) That part of a fuse which carries the current of the circuit, and all or part of which melts when the current exceeds a predetermined value. Also called fuse element.

fusel oil (chem) A colorless liquid with a disagreeable odor. It is obtained as a by-product in the alcoholic fermentation of such products as potatoes, grapes, grain, etc. Used as a substitute for butyl alcohol, as a lacquer thinner, as a shock-absorber fluid, and as a hydraulic brake fluid.

fusion point. See melting point.

fusion welding A group of processes in which metals are welded together by bringing them to the molten state at the surfaces to be joined, with or without the addition of filler metal, without the application of mechanical pressure or blows.

G

gabardine (text) A fine, smooth, wool material woven with a steep twill Many weights and qualities Also made in cotton.

gable (bldg) The vertical triangular end of a building from the eaves to the apex of the roof

gadget (ship) Any little handy contraption such as a scraper or special sailmaker's palm, etc.

gaff (nav) A spar used to extend the upper edge of a quadrilateral fore-and-aft sail of a sloop or a schooner rig

gage (carp) A tool used by carpenters to strike a line parallel to the edge of a board Also spelled gauge

gage (mach) A tool for measuring or transferring distances or dimensions, usually within one one-thousandth of an inch or less It may be either of the adjustable or non-adjustable type. The different types of gages are fixed gage, plug gage, ring gage, snap gage, thickness gage, and screw thread gage. For details see under their respective entries

gage (metal) 1 A term used to indicate the thickness of a metal plate or sheet, or the diameter of metal wire. 2. An instrument for measuring dimensions 3 A table of gage equivalents.

gage (print) 1 A piece of wood or metal (reglet, slug, or brass rule) used to determine a measure of any kind, to preserve uniform length of pages, position of form, width of margin, or similar purpose 2. Also a piece of wood, cardboard, or metal fastened on the tympan of a job press as a stationary guide to locate the sheets in feeding

gage (text) 1 Knitted fabrics A measure of fineness expressing the number of needles per unit length (across the wales) 2 Hosiery A measure of fineness expressing the number of needles per 1.5 inches on the needle bar

gage maker (mach) A skilled machinist who specializes in making and repairing gages or measuring instruments

galley (print) The shallow tray used by compositors to hold type after lines have been set in the composing stick. The usual full-length galley is about two feet long and from four to seven inches wide

galley (ship) The kitchen of a vessel

galley press (print) A proof press upon which the galley of type may be placed and proof taken It consists of a flat iron bed with two sides high enough to form tracks upon which an iron cylinder, covered with cloth or felt, is made to move When the type has been rolled with ink, the sheet of paper is laid on and the cylinder is rolled over to make the impression

galley proof (print). Any proof taken of type matter while it is still on a galley, or before it is made up into pages

gallic acid (chem) An acid found in tea gall nuts, etc, as a constituent of tannins

gallon. The standard gallon of the United States contains 231 cubic inches, or

8.3389 pounds avoirdupois of distilled water at its maximum density and with a barometer of 30 inches. The English imperial gallon contains exactly 1.20 U S. gallons.

galvanic cell (el) An electrolytic cell that is capable of producing electric energy by electrochemical action.

galvanizing (metal) A process for coating metal with a thin layer of zinc by dipping the metal into a bath of molten zinc or "spelter", as it is called commercially The chief purpose of galvanizing is to prevent corrosion.

galvanometer (el) An instrument for indicating or measuring a small electric current, or a function of the current, by means of a mechanical motion derived from electromagnetic or electrodynamic forces which are set up as a result of the current.

galvanotropism (el) The tendency of an organism to grow, turn or move into a certain relation with an electric current.

Galvanotype (print) A trade name for a style of intaglio copperplate upon which the camera and the etching acid are employed to engrave the picture.

gambrel (bldg) A symmetrical roof with two different pitches or slopes on each side.

gamma (phot) A unit for measuring density in negatives. The gamma of a negative indicates the ratio between its range of densities and the corresponding range of light contrasts in the subject photographed.

gamma graph A radiograph produced by gamma-rays

gamma rays. A form of radiant energy derived from the atomic transformation of radioactive matter, the wave length of the rays being about 10^{-11} cm.

gangplank (ship) A board with cleats, forming a bridge reaching from a gangway of a vessel to the wharf.

gangue (metal) The non-metallic elements or impurities in iron ore.

gangway (ship) The opening in the bulwarks of a vessel through which persons come on board or disembark. Also a gangplank.

gap (aer) The distance separating two adjacent wings of a multiplane

garboard (ship) The lowest strake of outside planking or plating next to the keel. Also known as strake A

garnetting (text) 1 The tearing of manufactured materials into fibers One of the first steps in securing wool for manufacture 2. The tearing apart of raw cotton or linters to make a felt (for mattresses)

gas (aer) To replenish a balloon with fresh gas in order to increase the purity or to make up for a loss of gas

gas bells (phot) Minute pimples or blisters in a negative caused by insufficient rinsing between development and fixing

gas black (print) A black pigment for printing inks, produced by burning gas with insufficient air for combustion. The soot is deposited on metal cylinders in very much the same way as lampblack from oil.

gas brazing (weld) A blazing process wherein the heat is obtained from a gas flame See also brazing

gas cell (aer) In an airship, one of the bags containing the aerostatic gas.

gas-cell fabric (aer) The fabric used in making gas cells for rigid airships.

gas-cell net (rigid airship) A small-mesh netting of cord, intended to assist the fabric of the gas cells in transmitting the gas force to a wire netting of coarser mesh and to the longitudinals, both being fitted between the longitudinals It may be compared to the net of a free balloon. Sometimes called "gas-cell netting" or "cord netting"

gas current (el) A current flowing to an electrode and composed of positive ions which have been produced as a result of gas ionization by an electron current flowing between other electrodes.

gas-electric drive. A self-contained system of power conversion in which a gas engine supplies power to the driving motors through an electric generator which it operates. The prefix "gas-electric" is applied to ships, locomotives, cars, buses, etc., which are equipped with this drive

gas engine. A kind of internal combustion engine using gas Also, in a broad sense, any internal combustion engine

gas filled-tube rectifier (el) A rectifier in which rectification is accompanied by the ionization of an inert gas caused by a unidirectional flow of electrons from a heated electrode within an enclosed space

gas fitter A mechanic who instals gas equipment.

gas pocket (weld) A cavity in a weld caused by gas inclusion.

gasproof So constructed or protected that the specified gas will not interfere with its successful operation. Compare "gas-tight."

gas shaft (aer) A passageway between the gas cells of an airship to permit the escape of gas which has been discharged from the cells.

gas-shaft hood (aer) A hood or cowl, located on the outer cover of a rigid airship at the outer end of a gas shaft.

gassing (text) A singeing or burning off of protruding fibers on cotton yarn, thread, or cloth with a glass flame to make a smooth surface.

gassing factor (aer) The quantity of aerostatic gas required to maintain an aerostat for one year It is ordinarily expressed as a percentage of the gas volume

gastight So constructed that the specified gas will not enter the enclosing case under specified conditions of pressure. Compare "gasproof."

gas tube (el) A vacuum tube in which the pressure of the contained gas or vapor is such as to affect substantially the electrical characteristics of the tube.

gas welding A non-pressure (fusion) welding process wherein the welding heat is obtained from a gas flame.

gate (foundry) A pipe or tubular opening in a sand mold which permits the molten steel to be poured in without injury to the surface of the mold.

gate (nav) A hinged, semi-circular metal band attached to a thwart to help stay a mast.

gathering (book) The process of collecting one copy of each signature to make the complete book. The folded sheets or signatures are placed in piles in their proper order, each pile containing the copies of one signature. One copy is taken from each pile and the operation is repeated, each round of the piles making a complete book. Machine gatherers are now employed for this process.

gauge See gage

gauss (el) The CGS electromagnetic unit of magnetic induction The cgs unit of *magnetic induction is obtained from the* law connecting magnetic induction with the electromotive force induced in a conductor which is moving through a magnetic field.

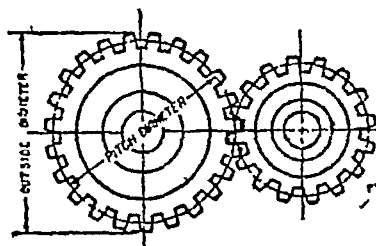
Gauss' theorem (el) States that the integral over any closed surface of the normal component of the electric displacement is equal to the electric charge within the surface

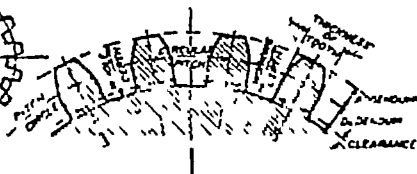
gauze (text) See cheesecloth

gear (aut) A synonym for "speed", as "first gear," "second gear," "reverse gear," etc (ship) A comprehensive term used in speaking of all the implements, apparatus, machinery, etc., which are used in any given operation. For example steering gear, running gear, cleaning gear, etc. (mach) A generic term for any toothed wheel

geared propeller (aer) A propeller driven through gearing, generally at some speed other than the engine speed.

gearing (mach) A train of meshing toothed wheels.





At Left Illustration Showing Outside Diameter and Pitch Diameter of Gear Teeth
Below Names of Gear Tooth Parts

(Courtesy South Bend Lathe Works)

gearless motor (el) A traction motor in which the armature is commonly mounted directly on the driving axle, or is carried by a sleeve or quill which surrounds the axle.

gear ratio (aut) The ratio at which gears can transmit speed or torque. When speed is increased, torque is decreased and vice versa. For example, a 60-tooth gear driving a 12-tooth gear gives a ratio of 1-5, which means that the driven gear revolves five times at fast as the driving gear, increasing speed and reducing torque On the other hand, a 12-tooth gear driving a 60-tooth gear gives a ratio of 5-1, which means that the driven gear revolves one-fifth as fast as the driving gear, increasing torque and decreasing speed. Gear ratio is often employed to mean merely the reduction between the crankshaft speed and the rear wheel speed

Geissler tube (el) A special form of discharge tube for showing the luminous effects of discharges through rarefied gases The density of gas is roughly one-thousandth that of the atmosphere.

gelatin (chem) A protein derivative made by treating collagens with superheated steam, or boiling in dilute acids. One of the distinguishing characteristics of gelatin is its ability to make heat reversible gels Often classified as an albuminoid.

gelatin (phot) A complex substance obtained from the bones and skins of animals and used to hold the light-sensitive silver compounds or salts.

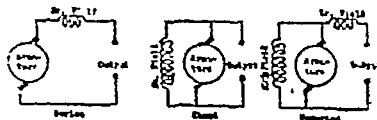
general purpose motor (el) Any motor of 200 hp or less and 450 rpm or more, having a continuous rating, and designed, listed or offered in standard ratings for use without restrictions to a particular application.

generating station (el) A plant wherein electric energy is produced from some other form of energy (e g, chemical, mechanical, or hydraulic) by means of suitable apparatus

generator (el) See electric generator

generator voltage regulator (el) A regulator which functions to maintain the voltage of a synchronous generator, condenser, motor, or of a direct-current generator, at a predetermined value, or vary it according to a predetermined plan

TYPES OF GENERATOR WINDINGS



Genre (phot) Genre pictures are those of everyday incidents, human interest pictures that tell a story, pictures that are illustrative of common life.

genus (bio) A group of related species

geodetic surveying See surveying

geodetic triangulation (surv) Includes all those operations required to determine

either the relative or absolute positions of different points on the earth's surface when such operations are based on the properties of plane and spherical triangles

geology The science which treats of the history of the earth and its life, especially as recorded in the rocks Three principal branches or phases are usually distinguished 1 structural, or geotectonic geology, treating of the form, arrangement, and internal structure of the rocks 2 dynamic geology, dealing with the causes and processes of geological change. 3 historical geology which, aided by other branches, aims to give a chronological account of the events in the earth's history Other sub-divisions are economic geology, that branch of geology which deals with the application of the science in industrial relations and operations, stratigraphic geology, a study of the succession of the beds of rock laid down during the progress of geologic ages, and petroleum or oil geology, which treats of the geologic factors involved in the origin, accumulation and production of petroleum

geometric pen (draw) A drawing or marking point arranged in a mechanism so that it will draw lines and ornaments in geometric patterns on the back and border of paper currency, stock certificates, diplomas, etc

geometric progression. A sequence of terms such that the ratio of each term to the immediately preceding one is the same throughout the sequence. The general form is usually written a, ar, ar^2, ar^{n-1} where a is the first term, r the common ratio (or simply ratio) and ar^{n-1} the last or nth term The sum of such terms is sometimes called a geometric progression, although geometric series is more common

geometrical pitch (aer) The distance an element of a propeller would advance in one revolution if it were moving along a helix having an angle equal to its blade angle.

geotropism (bot) Reaction to gravity

get-away speed (aer) The air speed at which a seaplane becomes entirely airborne.

giant hemlock (*tsuga heterophylla*) Also known as Western hemlock. Used for finishing and in general construction. Wt. 28 lbs per cu ft. (air-dried) Maximum crushing strength 7,910 lbs per sq in Shearing strength parallel to grain 1,170 lbs per sq in

giant sequoia (wood) Grows to heights of over 300 ft. A source of heavy timbers

gib (mach) A piece located alongside a sliding member to take up wear

gib (ship) A metal fitting that holds a member in place, or presses two members together

gilbert (el) The CGS electromagnetic unit of magnetomotive force The gilbert is the unit of magnetomotive force in the cgs electromagnetic system such that the value of the magnetomotive force in gilberts in any magnetic circuit is equal to the line integral around the circuit of the magnetic intensity when the magnetic intensity is expressed in oersteds and the length in centimeters

gin pole. A beam at the top of a derrick for hoisting crown blocks and other parts into the derrick

girder (carp) A timber used to support wall beams or joists

girder (engr). A simple or built-up beam usually of steel, designed to carry loads to piers, columns, supports, or abutments

girt (ribband) (bldg) The horizontal member of the walls of a full or combination frame house which supports the floor joists or is flush with the top of the joists

girth (ship) The measurement around the body of a ship The half girth is taken from the center line of the keel to the upper deck beam end

glair (book) The white of eggs used as a size to hold gold leaf in stamping book covers

gland (aer) A short tube fitted to an envelope or gas bag so that a rope or line may slip through it without leakage of gas or air.

glass. Glass is roughly classified as lead glass or lime glass. Lead glass (also known as "flint glass") has the higher luster but is more brittle and more easily scratched. It is used principally for optical and decorative purposes. Lime glass (also known as "crown glass") is also used for optical purposes, particularly in compound lenses, but its chief use is in windows, especially where the glass is subjected to strain, as in automobile windows See also glass making laminated safety glass, plate glass.

glass cutter The common glass cutter has a small, sharp, hardened-steel wheel mounted on a pin in the handle. The face of the cutter is notched for breaking the glass. Diamond-tipped cutters are sometimes used.

glass electrode (chem) An electrode used for determining hydrogen ion concentration, which is rapidly replacing all others. It is rapid, accurate, and does not in any way contaminate the solution to be analyzed.

glass making Glass is made by combining a silicate such as common sand, an alkali such as sodium carbonate, and either lead or lime. Carbon, arsenic, or other substances are usually added as purifiers, and iron, copper, or chromium may also be added to change the color, hardness, or other properties. These solid components, melted together, form liquid glass. When its impurities rise to the surface, the molten glass is drawn off and allowed to harden.

glaze (met) Hard clear ice formed from super-cooled rain or cloud drops, or from drops frozen after impact with some object, i.e., aircraft.

glazed paper A paper with a hard glossy surface, usually finished on one side only

glazing (phot) See ferrotyping

glide (aer) To descend at a normal angle of attack with little or no thrust.

glide landing (aer) A landing in which a steady glide is maintained to the landing surface without the usual leveling-off before contact.

glider (aer) An aircraft heavier than air, similar to an airplane but without a power plant.

gliding angle (aer) The angle between the flight path during a glide and a horizontal axis fixed relative to the air

gloss ink (print) An ink containing an extra quantity of varnish which gives it a glossy appearance when dry

glossy (phot) A term applied to the glazed surface of a print generally dried on a ferrotype plate Glossy prints are brilliant and show fine detail. They are generally preferred for making printing cuts.

glucose (chem) $C_6H_{12}O_6$, dextrose, corn sugar, grape sugar, starch sugar; forms a monohydrate and exists in numerous isomeric forms.

glue. A sticky substance obtained by boiling hoofs, horns, or skins of animals, and also from fish. It is marketed in thin, hard, brittle cakes that must be dissolved or melted for use, or in liquid form prepared for use. Used in cabinet making, binderies, etc.

glue joint (carp) A joint held together with glue.

goldbeaters-skin fabric (aer) A fabric consisting of a layer of light, fine, strong cloth, usually cotton, to which one or more layers of goldbeaters skin have been cemented.

gold leaf Very thin leaves of beaten gold, used in typography, for book covers and edges, in sign painting, for decorative work, etc. The ancient Egyptians hammered out gold leaf between pieces of the intestines of an ox, while the Greeks and Romans employed parchment. This process is still used, as no other means has been invented to supersede hand work in beating the leaf to the required thinness The beaten leaves are laid in books, the paper of which is rubbed with chalk to prevent the leaf from sticking

to it. There are a number of imitations or substitutes for genuine gold leaf See foil.

goniometer (matr) An instrument for measuring angles

gooseneck (ship) A return, or 180 degree bend, having one leg shorter than the other An iron swivel making up the fastening between a boom and a mast. It consists of a pin and an eyebolt, or clamp It permits free movement of the after end of the boom in any direction, with the gooseneck as a center Sometimes called a "pacific iron."

governor A regulating device, generally of the centrifugal-ball type. With increasing speed of an engine, the balls fly out and depress a sleeve or sliding rod which closes a valve.

gradation (phot) The range of tones from the highest lights to the deepest shadows in negatives or prints

gradient (met) A change in any airmass property measured perpendicularly to iso-property lines and extending from high to low property values For instance, the pressure gradient is measured perpendicular to the isobars directed from high to low pressure. Also applied to winds blowing in conformity with the orientations and spacing of isobars, or determined by the pressure gradient in a horizontal plane

gradient (phy) The rate at which a variable quantity, such as temperature or pressure, changes in value, in these instances, called "thermometric gradient," and "barometric gradient," respectively

graduate (chem) A container with marks on the side graduating the capacity of the vessel in terms of a system for measuring fluids

Graham's law (phy) The rate of flow of a gas is universely proportional to the square root of its density

grain (paper) In all machine made paper the fibers which go to make up the sheet lie to a large degree in one general direction, due to the flowing of the pulp on the moving screen which forms the sheet The direction of these fibers indicates the grain of the paper

gram A unit of weight (mass) in the metric system, one-thousandth of a standard kilogram of platinum preserved in Paris. It was intended to be the weight of one cubic centimeter of water at 4° C, the temperature at which its density is a maximum

granny (rigging) A knot resembling a reef, except that the standing and running parts of each rope do not pass through the loop of the other in the same direction

graph (math) The representation of varying relationships as between quantity and time by visual means There are bar graphs, broken and curved line graphs, and ideographs in which quantities are represented by tiny figures of people, trains, factories, etc. Graphs can also be used to solve algebraic equations

graphical representation (alg) Showing on a graph the relation between two variables connected by a formula or equation.

graphic arts A comprehensive term including painting, drawing, engraving, printing, lettering, writing, and other arts using lines or marks on a surface, as distinguished from sculpture, music, etc.

graphite (chem) A form of crystallized carbon generally soft and flaky in form which makes it an excellent lubricant. Because it is a good conductor and will withstand high temperatures, it is used in making crucibles, electrodes in electric furnaces, and in making brushes for electric motors and generators Mixed with clay it is the commonly known black "lead" used in making pencils It was formerly known as plumbago

grapnel (nav) A small multiple-fluked anchor used in dragging or grappling operations

grating (ship) An open iron lattice work used for covering hatchways and for

forming a platform in engine room, stair landings, etc.

graupel (met) Soft hail. It is frequently associated with snow squalls.

graver An engraver's tool for cutting, chasing, etc. See burin.

gravitation (phy) See attraction.

gray birch (wood) A soft, on-durable wood. Used mostly for paper pulp and fuel, occasionally for spools, lasts, hoops, etc.

gray cloth (text) See gray goods.

gray goods (text) Woven or knitted fabrics which have received no bleaching, dyeing, or finishing treatment. Also known as "gray cloth."

grease wool (text) Wool as it comes from the living sheep, not washed or scoured.

great circle (air nav) A circle on the earth's surface whose plane passes through the center of the earth

great circle course (air nav) The route between any two places along the circumference of the great circle which joins them. It is the shortest distance between two points over the surface of the earth

great circle distance (air nav) The length of the great circle arc joining two points

Greek fret (arch) A style of ornament much used in Greek art, characterized by angular alternations and interlocking lines in various patterns.

green ash (*fraxinus lanceolata*) A sturdy wood having uses similar to those of white ash, i.e., making tool handles, furniture, etc. Wt. 39 lbs. per cu ft. (air-dried) Maximum crushing strength 7,-580 lbs per sq in Shearing strength parallel to grain 2,080 lbs per sq in.

greenland spar (chem) See cryolite

green sand (foundry) Sand in its natural state used for making molds

grid (rad) An electrode having one or more openings for the passage of electrons or ions.

GREEK ALPHABET

Caps	Lower case	Greek name	English sound
Α	α α	Alpha.	A.
Β	β ϐ	Beta.	B
Γ	γ	Gamma	G
Δ	δ	Delta	D
Ε	ε	Epsilon.	E.
Ζ	ζ	Zeta.	Z
Η	η	Eta.	E.
Θ	θ ϑ	Theta.	Th.
Ι	ι	Iota.	I
Κ	κ	Kappa.	K.
Λ	λ	Lambda	L.
Μ	μ	Mu	M
Ν	ν	Nu	N
Ξ	ξ	Xi.	X.
Ο	ο	Omicron.	O short.
Π	π ϖ	Pi.	P
Ρ	ρ	Rho	R.
Σ	σ ς	Sigma.	S
Τ	τ	Tau	T
Υ	υ	Upsilon.	U
Φ	φ ϕ	Phi.	F
Χ	χ	Chi.	Ch.
Ψ	ψ	Psi	Ps.
Ω	ω	Omega.	O long

grid (storage battery) A metallic framework employed in a storage cell or battery for conducting the electric current and supporting the active material.

grid azimuth (surv) The grid azimuth of a given line is the angle measured clockwise from grid north of a map to the given line

grid bias (rad) See direct grid bias.

grid condenser (rad) A series condenser in the grid or control circuit of a vacuum tube

grid leak (rad) A resistor in a grid circuit, through which the grid current flows, to affect or determine a grid bias

grids (el) Electrodes which are placed in the arc stream and to which a control voltage may be applied.

grid voltage supply (rad) The grid voltage supply of a thermionic vacuum tube is the means for supplying and applying with proper regulation a potential to the grid of the vacuum tube, which is usually negative with respect to the cathode.

grinding (metal) The removal of metal by means of rigid wheels containing abrasive distributed throughout them.

gripe (ship) The sharp forward end of the dished keel on which the rudder is hung

gripes (ship) The fitting used to secure a boat in its stowage position on board ship For boats secured at the davit heads, gripes are made of tarred hemp woven with a wood mat, backed with canvas, to hold the boat against the strongback. For lifeboats, the lower ends of the gripes are usually fitted with a slip hook. For boats secured in cradles, the gripes are usually of metal, tightened with turnbuckles and arranged to prevent the boats from lifting from the cradles when the deck becomes awash.

grippers (print) On job presses, the iron fingers attached to the platen to keep the sheet in place and take it off the type after the impression

grommet (ship) A ring of candle wicking used as a washer or gasket around bolts and studs to make a watertight joint.

groove (weld) The opening provided between two members to be joined by a groove weld.

groove angle (weld) The total included angle of the groove between parts to be joined by a groove weld

groove weld. A weld made by depositing filler metal in a groove between two members to be joined The standard types of groove welds are square groove weld, single-vee groove weld, single-bevel groove weld, single-U groove weld, single-J groove weld, double-vee groove weld, double-bevel groove weld, double-U groove weld, and double-J groove weld.

gross lift (aerostat) The buoyancy under standard conditions of density, purity, and fullness

gross ton. See long ton.

gross tonnage (ship) This means the entire internal cubic capacity of a ship expressed in terms of 100 cubic feet per ton. It is the clearest measuring rod after that of deadweight tonnage and is most accurate as a descriptive term when applied to passenger vessels.

gross weight (airplane) The total weight of an airplane when fully loaded. See full load.

gross weight (aut) This is expressed in tons to the nearest half ton The gross weight of a vehicle is defined as the chassis weight, plus the weight of the cab and the entire body fully equipped and serviced for operation, plus the maximum allowable pay load and weight of all operating personnel.

ground (art) In etching, the covering or coating on the plate, which is a substance that is impervious to the action of acid. Also called the "etching ground."

ground (aut) Connection of an electrical unit to the engine, frame, etc., to return the current to its source

ground (bldg) A strip of wood assisting the plasterer in making a straight wall and in giving a place to which the finish of the room may be nailed

ground (el) A conducting connection, whether intentional or accidental, between an electric circuit or equipment and earth, or to some conducting body which serves in place of the earth The British term for ground is "earth", in electricity

ground angle (aer) See landing angle

ground block (print) A block to print a tint of flat color, upon which another color is to be printed later, a tint block.

ground clamp (el) A clamp used in connecting a grounding conductor to a grounding electrode or to a thing grounded. Also called grounding clamp

ground current (el) Any current flowing in the earth Specifically, currents flowing to earth through ground conductors

or currents flowing in conductors embedded in the earth are commonly referred to as ground currents

ground detector (el) An instrument or an equipment used for indicating the presence of a ground on an ungrounded system.

grounded circuit (el) A ciruit in which one conductor or point (usually the middle wire or neutral point of transformer or generator windings) is intentionally grounded, either solidly or through a current-limiting device.

ground floor (bldg) The floor of a building on a level with the ground or nearly so.

ground frost (met) Often called Jack Frost. It is a thin layer of frost on surface objects, deposited instead of dew when the temperature is below freezing

grounded parts (el) Those parts which are so connected that, when the installation is complete, they are substantially of the same potential as the earth.

ground gear (aer) The gear or equipment necessary for the landing and handling of an airshop on the ground

ground loop (aer) An uncontrollable violent turn of an airplane while taxying, or during the landing or take-off run

ground lug (el) A lug used in connecting a grounding conductor to a grounding electrode or to a thing grounded

ground plate (el) A plate of conducting material buried in the earth to serve as a grounding electrode.

ground return circuit (el-tg-tp) A circuit in which the earth is utilized to complete the circuit. Also called earth-return circuit.

ground school (aer). A school in which instruction is given to a student undergoing flight training

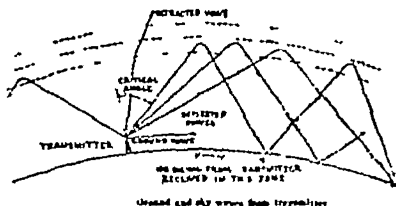
ground speed (aer) The horizontal component of the velocity of an aircraft relative to the ground

ground speed meter (air nav) An instrument for determining ground speed

ground switch (el) A switch used to connect or disconnect a grounding conductor Also called grounding switch.

ground temperature (air nav) Temperature of the air at a ground station

ground wave (rad) That part of the radiation from an antenna which travels along the surface of the earth The ground wave suffers energy losses because of earth currents which it induces and because of dielectric effects As a result of this, it is effective over only relatively short distances. See also sky wave



Ground and sky waves from transmitter

groundways (ship) Stationary timbers or tracks laid on the ground, or foundation cribbing upon which the sliding timbers or ways (supporting a vessel to be launched) travel.

ground wire (of an overhead line) A conductor having grounding connections at intervals, which is suspended usually above, but necessarily over the line conductor to provide a degree of protection against lightning discharges.

ground wire (rad) A conductor leading to an electric connection with the ground.

ground wood (paper) A paper pulp made by mechanically grinding the wood against a grindstone, as distinguished from pulp made by cooking or digesting wood chips in a solution of soda or other chemicals. Wood pulp paper is of a low grade, like newspaper Also called "mechanical wood pulp"

guayule (bot) A shrub native to Mexico, with a high proportion of rubber This shrub is planted in the spring and can be harvested to some extent the following autumn. It yields about 1100 *lbs of* rubber per acre when planted densely If allowed to grow for four or more years the yield is increased and the subsequent cost is lowered

gudgeon On machines, a metal pin or bolt fastened in the end of a driving shaft or axle, and forming the journal upon which it turns

gudgeons (ship) Small metal fittings similar to eyebolts, secured to the sternpost of very small boats on which the rudder hangs Used in place of the rudder hanger of larger boats

guided bend test (weld) A bending test wherein the specimen is bent to a definite shape by means of a jig

guide rope (aer) See drag rope

guilloche (arch) (pron gwi-losh') An ornament formed by two or more intertwined bands or strings, an ornamental braid or rope, a classic form of decoration in common use

gum acacia (chem) See gum arabic.

gum arabic (chem) A mixture of several gums the best being that obtained from Acacia Senegal, it is usually completely soluble in water

gum dammar (chem) An oil soluble gum which acts as an efficient stabilizer of water-in-oil emulsions

gum tragacanth (book) A marbling size used as a filler in preparing books

gums (chem) Carbohydrate derivatives consisting largely of glycoside like polymers of hexoses and pentoses, together with complex acids

gun metal Any type of bronze, cast iron or steel suitable for making firearms or cannon.

gunwale (ship) The line where a shelter deck stringer meets the shell Pronounced "gunnel."

gunwale bar (ship) An angle on the deck connecting both deck and shell Pronounced "gunnel."

gusset plate (ship) A tie plate used for fastening posts, frames, beams, etc., to other objects

gust (met) Brief and well-defined variations in direction and velocity of any wind, as measured over an interval of three or more minutes A fluctuation from the average wind.

gutta percha. The purified, coagulated milky juice obtained from various trees of the geni *palaquium* and *payena* whose origin is tropical Asia, South America and the Philippines Used for insulation of electric wires and the like, and for waterproofing

gutter (book) The blank space which gives the back, or binding margin of a book sheet. Each page of a book or pamphlet has a top margin, a foot margin, and back or gutter margin.

gutter (ship). The gutter or runway between the gunwale and the gutter angle bars, forming a channel for water to run to deck scuppers

gutter angle bar (ship) See waterway bar

guy A guide rope, chain, or rod attached to anything to steady it, a rope which holds in place the end of a boom or spar, a rod or rope attached to the top of a derrick and extending obliquely to the ground where it is fastened. In construction, a tension member having one end securely held and the other attached to a pole, cross arm or other structural part which it supports. A rope used to steady the poles and walls of a tent.

guy anchor A device so installed (usually buried in the earth or in rock) as to provide a firm point of attachment for a guy

guys (ship) Wire or hemp rope or chains to support booms, masts davits, etc., Guys are employed in pairs Where a span is fitted between two booms for example, one pair only is required for the two

gybe (nav) A sail is "gybed" when, in turning a boat's head away from the wind, the sail is allowed to swing from one side to the other the wind being aft or nearly so, and the sail full, first on one side and then on the other

gyro (aer) See directional gyro, automatic pilot, gyro horizon.

gyro horizon (aer) A gyroscopic instrument that indicates the lateral and longitudinal attitude of the airplane by simulating the natural horizon.

gyro pilot (aer) See automatic pilot.

gyroplane (aer) A type of rotor plane whose support in the air is chiefly derived from airfoils rotated about an approximately vertical axis by aerodynamic forces, and in which the lift on the opposite sides of the plane of symmetry is equalized by rotation of the blades about the blades' axes

gyroscopic camera (phot) A motion picture camera resembling in principle the gyroscopic steering device used on ocean liners and the gyroscopic stabilizer used on large airplanes to keep them on an even keel. It permits the cameraman to follow a player completely around a set.

H

hachures (surv) Short, parallel or slightly divergent lines running in the direction of a slope, used to indicate relief on a map

hacksaw (mach) The hacksaw is a metal frame used to hold blades specially made for the cutting of metals It is generally equipped with two pin spindles to hold the blade under tension, the one on the handle being equipped with a knurled sleeve which locks the blade in place. The frame is often adjustable to accommodate various lengths of blades

hacksaw blades (tool) Tools made of high grade tool steel, hardened and tempered. There are two types the all-hard and the flexible. All-hard blades are hardened throughout, while only the teeth of flexible blades are hardened All blades are from 7/16 to 9/16 of an inch wide, have from 14 to 32 teeth per inch, and are from 8 to 16 inches long Each blade has a hole at each end which hooks to pins in the frame The teeth of all hacksaw blades are set to provide clearance for the blade, the three different kinds of set are alternate set, raker set, and undulated set.

hail (met) Precipitation in the form of ice drops It is associated with cumulonimbus clouds, and is found in nearly every thunderstorm where the freezing level is within the cloud.

haircloth (text). A fabric made with cotton or linen warp and horsehair filling Hair filling is thrown to the face by satin weave Used for millinery and for stiffening in coats.

halation (phot) A blurred effect resembling a halo, usually occurring around bright objects, caused by reflection of rays or light from the back of the negative material Modern films are coated on the back with a special dye to prevent halation.

halation (radiography). The spread of the image in regions of intense exposure due to photo-chemical action in the film or intensifying screens or to fluorescent light scatter, but not to scattered radiographic rays

half beams (ship) Short beams extending from a machinery or boiler casing, or from the hatch side coaming, to the side of the ship

half-breadth plan (ship) A plan of one-half of a vessel, divided by a center line drawn through the stem and stern posts. It shows the water, bow, and buttock lines

half-sectional view (draw) Such a view may be drawn for a symmetrical object. This type of section is accomplished by passing two cutting planes at right angles to each other along the center lines or symmetrical axes Thus one-quarter of the object is considered removed and the interior exposed to view Invisible outlines are generally omitted from the sectioned and unsectioned portions of the object but are shown in the unsectioned portion if the object is thus more clearly described The half section provides a view which shows the internal and external features of an object.

halfstuff (paper) The pulp after it has been washed, broken, bleached and drained before it goes to the beaters Also called "halfstock."

halftone (print) An engraved plate made by photographic and chemical methods, in which the surface or printing part is composed of a series of fine dots A halftone process plate is made by photographing the picture through a screen interposed between the copy and the sensitive plate in the camera.

halftones (phot) All gradations between highlights and deepest shadows

halftone screen (print) The "dots" of a halftone, which are mechanically made substitutes for the grains in the tones of the original copy, are produced by photography through a mesh or grating called a "halftone screen."

half-track vehicle (aut) One which is supported and steered by wheels on the front end, and supported and driven by a track on the rear end. Some half track vehicles, in addition to having driving tracks, are also equipped with front driven axles Such vehicles are widely used for military purposes because of their cross-country traveling ability

Hall effect (el) When a thin rectangular sheet of metal carrying an electric current in the direction of its length is subjected to a magnetic field normal to the sheet, an electromotive force is developed which is at right angles both to the direction of the current and to the magnetic field A general statement of the Hall effect is "when a conductor in which a current is flowing is placed in a magnetic field, a potential gradient is developed which is, at each point, a function of the vector product of the magnetic intensity and the current density"

halliards (ship) Ropes used to hoist and lower heads of sails or the yards or gaffs which spread heads of sails, also flag and signal hoists

halo (met) A ring or series of rings about the moon or sun caused by their being partially obscured by clouds composed of ice crystals.

halved joint (carp) A joint made by cutting half of the wood away from each piece so as to bring the sides flush

hammerman (metal) See forgeman.

hammer scale (forge) The scale on the surface of heated metal, an oxide coating, which is broken off during forging

hammer slag (forge) The slag driven off by a hammer or forge from a lump of wrought iron that has been taken from the furnace.

hammer welding See forge welding

hand bumping (sheet metal) Hand bumping is a process of forming sheet metal into complex curvatures and shapes, either in dies or on sandbags, by the application of a number of light blows with a mallet or special bumping hammer

hand drill (mach). A tool used for driving twist drills. It consists of a handle, a frame, a gear assembly, and a chuck. Some hand drills are equipped with a speed change and with ratchets for working in close quarters

hand fit. See fits

handkerchief lawn (text) A fabric made of fine, high count, combed cotton in a light weight. Weave is plain White and in color

handkerchief linen (text) A fine, soft, linen material used principally for handkerchiefs

handling line (aerostat) A line attached to the side of an airship or balloon for use by the ground crew in handling the aerostat.

handling line (airplane) Two lines of steel strand attached to the upper wings of a seaplane for steadying it when hauled out of the water aboard ship

hand saw (carp) A tool that consists of a steel blade with a wooden handle attached to one end. The blade is made

narrow at one end known as the point or toe, the other end is known as the handle or heel end. The cutting edge is a line of cutting teeth which act like two rows of cutting instruments running close together in parallel grooves Both ends of the short chips of wood are cut at the same time and the smaller chips (sawdust) are rolled or pushed out by the bevel part of the teeth. The number of a saw is determined by the number of teeth points per inch The two types are crosscut and ripsaw

handsaw file A triangular file for sharpening handsaws

handset (tp) A combination of a telephone transmitter and a telephone receiver mounted on a handle

hand shield (weld) A protective device used in arc welding for shielding the face and neck, equipped with a suitable filter glass lens and designed to be held by hand.

hangar (aer) A shelter for housing airplanes

hanger (el) See cable rack.

hank (metal) In the metallurgical industry, the name given to a bundle of wire

hard-fiber paper Specially treated paper used as a base in the manufacture of various kinds of vulcanized fiber and converted by chemical or other processes

hard materials (StM) Those which offer great resistance to indenting or scratching "Soft" and "hard" are indefinite terms which acquire a definite meaning when a definite hardness test is specified

hardness (phot) Excessive contrast in negatives or prints, too great a difference between lights and shadows. See contrasty

hard sized (paper) Describes paper making material which is sized by a special hardening process due to the increased proportions of rosin or other ingredients

hard surfacing (weld) The application of a hard, wear-resistant alloy to the surface of a softer metal, by an arc or gas welding process

harmonic (rad) A component of a periodic quantity which is an integral of the fundamental frequency For example, a component the frequency of which is twice the fundamental frequency is called the second harmonic.

harness (text) Name given to the heddles and heddle frames which hang from the top bar and which are attached below to the lams and pedals On many two-harness looms there are no lams, the harness frames being attached directly to the pedals

hatch bars (ship) The bars by which the hatches are fastened down

hatch battens (ship) Thin strips of wood fitted tight against the coamings to hold the hatch covering or tarpaulin in place.

hatch covers (ship) Covers for closing up hatchways

hatchet (carp) A chopping and driving tool similar in some respects to a hammer Used for light cutting, trimming, hewing, and (because it is heavier than a hammer) for driving large nails or spikes It has a woolen handle and a steel head composed of a hammer head, an eye, and a blade To pull nails, some hatchets have a claw in addition to the hammer head, while others are notched in the lower edge of the blade Hatchets are made with two types of cutting edge, the single bevel and the double bevel. The latter is more common.

hatch strong back (ship) A member built up of plates and angles to provide a support for the hatch cover

hatchway (ship) One of the large square openings in the deck of a ship through which freight is hoisted in or out, and access is had to the hold There are four pieces in the frame of a hatchway The fore and aft pieces are called coamings and those athwartship are

called head ledges The head ledges rest on the beams and the carlings extending between the beams There may be forward, main and after hatchways, according to the size and character of the vessel.

hatchway coaming (ship) Vertical plates forming the border around a hatchway

hauled flat (nav) The condition of the sails when they are almost fore and aft, but still drawing.

hawse (ship) That part of a ship's bow in which are the hawse holes for the anchor chains.

hawse block (ship) See hawse plug

hawse hole (ship) A hole in the bow through which a cable or chain passes It is a cast steel tube, having rounded projecting lips both inside and out.

hawse-pipe (ship) A cast steel pipe connected to the hawse hole running from the shell to the deck, for chains to pass through.

hawse plug (ship) A stopper used to prevent water from entering the hawse hole in heavy weather.

hawser (ship) A cable used in warping and mooring

haze (met) Atmospheric pollution composed of salt particles, smoke, or dust. Over and near ocean's haze is primarily salt crystals

haze level (met) That level in the atmosphere above which haze is absent, or so limited that horizontal visibility is unrestricted.

header (carp) A short joist supporting tail beams and framed between trimmer joists, the piece of stud or finish over an opening, a lintel

heading (air nav) The angular direction of the longitudinal axis of the aircraft with respect to true north In other words, it is the course with the drift correction applied. It is true heading unless otherwise designated.

headlight (aut) A lighting unit on the front of a vehicle intended primarily to illuminate the road ahead of the vehicle

headroom (bldg) The clear space between floor line and ceiling, as in a stairway

heartshake (lumber) Also called heart rot A defect of the heartwood found in older trees especially the hemlock, it is seldom found in saplings The heartshake is evidenced by a small round cavity at the center of the tree or timber This cavity is causeu by decay and results in cracks which extend outward to the bark.

heat affected zone (weld) That portion of the base metal whose structure or properties have been altered by the heat of welding or cutting

heater (rad) An electric heating element for supplying heat to an indirectly heated cathode

heating element (el) The complete resistor, including the element carrier on which the wire is wound, as used in ovens, electric fires, radiators, etc. Also called "heating unit."

heating gate (weld) The opening in a thermit mold through which the parts to be welded are preheated.

heating unit (el) See heating element.

heat time (weld) The time of duration of each current impulse in pulsation welding

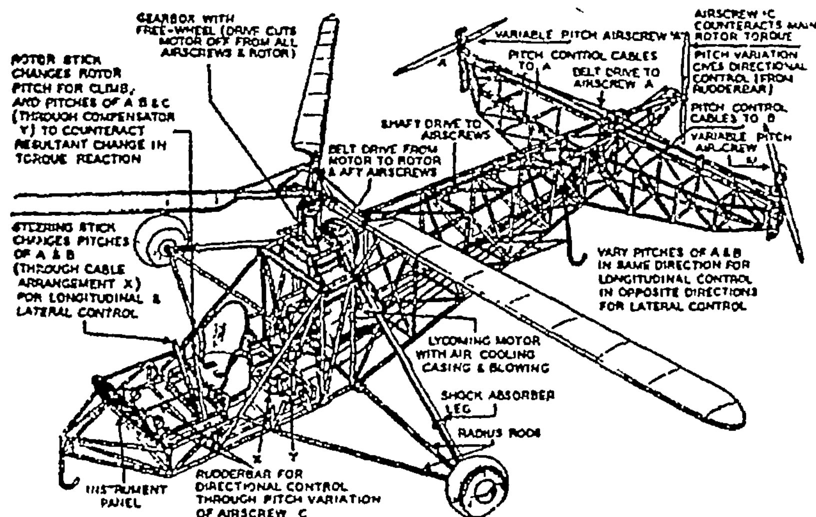
heat transfer coefficient (refrigeration) The quantity of heat transmitted through a unit thickness of substance per unit of area in a unit of time It is usually expressed in Btu per square foot per hour, per degree temperature difference per inch of thickness.

heat treatment (metal) The application of heat to metals for the purpose of improving their physical properties

heat unit (phy) See British thermal unit.

heave to (nav) To put a vessel in the position of being stopped, but ready to proceed. Either power or sailing boats may do this.

STRUCTURAL PARTS OF A HELICOPTER



(Courtesy, Sikorsky Aircraft Division United Aircraft Corp.)

hectograph A copying process for multiplying written or printed copies by means of a sheet of gelatin.

heddle (text) A device through which warp yarns pass to facilitate weaving

heddle eye (text) A loop or opening in the center of the heddle through which the warp thread passes

heddles (text) String, wire, or metal members through the eye of which the warp threads passes They are fastened vertically in the heddle frames or on the heddle sticks

heel (ship) The intersecting point or corner of the web and flange of a bar

heel of a mast (ship) The lower end of the mast, the end of the mast which fits in the step or the keel

heel of a rafter (carp) The end or foot that rests on the wall plate

helical (aut) A term used to describe gears shaped like a helix

helical gear A gear with teeth cut diagonally across its face.

helicopter (aer) A type of rotor plane whose support in the air is normally derived from airfoils mechanically rotated about an approximately vertical axis

heliotropism (bot) Phototaxis, heliotaxis, phototropism, reaction to light stimulation

helium (He) A colorless, inert gas found in the atmosphere. It may be obtained by fractional distillation of liquid air Used as a substitute for argon in the filling of incandescent lamps, and in balloons and dirigibles

helix The basic curve of screw threads It is the path traced by a point on the surface of a cylinder as it moves uniformly around the cylinder and at the same time moves uniformly lengthwise on the cylinder

helm (ship) The rudder steering wheel and tiller

helmet shield (weld) A protective device used in arc welding for shielding the face and neck, equipped with a suitable filter glass lens, and designed to be worn on the head

hematite (min) The most important commercial iron ore, containing as high as 70% iron. It is known chemically as anhydrous ferric oxide (Fe_2O_3) Its color is generally brick red, although it occurs in deeper shades up to black.

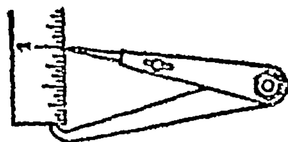
henry (el) The unit of inductance. The inductance present which will cause 1 volt to be induced if the current changes at the rate of 1 ampere per second. A henry is equal one billion (10^9) abhenrys

heptane (C_7H_{16}) A liquid hydrocarbon One of the constituents of petroleum

heptode (rad) A seven-electrode vacuum tube containing an anode, a cathode, a control electrode and four additional electrodes ordinarily in the nature of grids

hermaphrodite calipers (mach) A measuring tool generally used to scribe arcs, or as a marking gage in lay-out work. To adjust them to a rule, set the scriber leg slightly shorter than the curved leg, then with the curved leg against the end of the rule, adjust the scriber leg to the desired graduation on the rule Hermaphrodite calipers should not be used for precision measurements

HERMAPHRODITE CALIPERS



Heroult furnace (metal) An electric-arc furnace similar to the open hearth furnace except that it has a tilting arrangement and no outlet for gases. It usually has two carbon electrodes passing through the roof and adjustable in height. It is used either for smelting or for purifying already molten metal.

herringbone gear (aut) Double helical gears with teeth cut slanting in both directions to the center of the gear face.

herringbone twill (text) Zigzag effect produced by alternating the direction of the twill. It resembles the backbone of a herring

heterodyne reception (rad) (beat reception) The process of receiving radio waves by combining in a non-linear circuit element a received radio-frequency voltage (or a group of voltages resulting from modulation) with a locally generated alternating voltage, with the result that in the output there are frequencies equal to the sum and difference of the combining frequencies If the received waves are continuous waves of constant amplitude, as in telegraphy, it is customary to adjust the locally generated frequency so that the difference frequency is audible If the received waves are modulated the locally generated frequency is generally such that the difference frequency is superaudible and an additional operation is necessary if the original signal wave is to be reproduced.

hevea rubber (el) Rubber from the *hevea brasiliensis* tree Compounds containing 30 to 40 per cent of hevea rubber have electrical and mechanical properties superior to compounds insulated in accordance with the requirements of the National Electrical Code

hexagon. A plane figure having six angles and six sides. Usually a regular hexagon in which all the angles and all the sides are equal.

hexode (rad) A six-electrode vacuum tube containing an anode, a cathode, a control electrode and three additional electrodes ordinarily in the nature of grids

hickey (el) A fitting used to mount a lighting fixture in an outlet box or on a pipe or stud. It has openings through which fixture wires may be brought out of the fixture stem.

hickory *(wood)* See shagbark hickory

high key (phot). A print is said to be in a "high key" when there are few gradations of tone, none of which is very dark.

highlights (phot) The portions of a picture upon which the greatest amount of light is concentrated The denser portions of a negative or the lightest parts of a print.

high-pass filter (rad) A wave filter having a single transmission band extending from some critical or cut-off frequency, not zero, up to infinite frequency

high speed steel (mach) Alloy steel which does not lose its hardness when heated red hot under high-speed cuts Any tool steel which retains its temper or edge at high cutting speeds

high-wing monoplane (aer) A monoplane in which the wing is located at, or near, the top of the fuselage.

hip rafters (bldg) Rafters extending from the outside angle of the plates toward the apex of the roof.

hip roof (bldg) A roof which slopes up toward the center from all sides, necessitating a hip rafter at each corner

hitch (rigging) A temporary knot, fastening one rope to another or to a spar or post, so as to be readily undone, as a clove hitch

hoist. An apparatus for moving a load by the application of a pulling force, and not including a car or platform running in guides.

hoisting pads (ship) Metal fittings inside the boat often attached to the keel to take the hoisting slings or hoisting rods

hold (ship) An interior part of a ship, in which the cargo is stored. The various main compartments are distinguished as the forward, main, and after holds, or by numbers such as 1, 2, 3 4, etc.

holdfast (ship) A dog or brace to hold objects rigidly in place

holdfast (rigging) Holdfasts are used to anchor a line to the ground, as for a guy An example is a "deadman" which consists of a spar anchored and buried in the ground

hold time (weld) The time that pressure is maintained at the electrodes after the cessation of the welding current.

Hollander (paper) A name given to the rag-washing machine in a paper mill Also called "beating machine"

holystone (nav) A sandstone used in holystoning decks

home (ship) See tumble home

homespun (text) A coarse, strong wool material made of rough, woolen yarns in mixed colors. Similar to tweed. Used for overcoats and suits

homodyne reception (rad) A system of reception by the aid of a locally generated voltage of carrier frequency Sometimes called "zero-beat reception"

homogeneous glass. Glass of essentially uniform composition throughout its structure This term is used to distinguish the type from cased glass which is composed of two or more layers of different compositions, rather than to appraise the glass on the basis of freedom from streaks, striae, etc.

honeycomb (aer) A grid of intersecting surfaces used to check lateral disturbances in a fluid stream (aut) The name given to the type of radiator cell structure which it describes

hood light (aut) A lighting unit mounted under the hood of a vehicle to illuminate the engine compartment.

Hooke's law (phy) The elongation due to stretching is proportional to the tension, written $E=cT$, where E is the elongation, T is the tension, and c a constant. The law applies approximately, within limits for the tension, to springs, rods, etc.

hopped (mach) A term used among file makers to represent a very wide skip or spacing between file teeth.

hopper (metal) The trapdoor arrangement at the top of a blast furnace which dumps the charge into the furnace The hopper is arranged into two units so as to prevent the escape of gas.

horizontal axis (aer) See axes of an aircraft.

horizontal position (of welding) 1 *Fillet weld* A position of welding in which the weld is deposited on the upper side of an approximately horizontal surface and against an approximately vertical surface. 2. *Groove weld* A position of welding in which the axis of the weld lies in an approximately horizontal plane and the face of the weld lies in an approximately vertical plane.

horizontal tail area (aer) The horizontal tail area is measured in the same manner as the wing area, that is, with no deduction for the area blanketed by the fuselage, such blanketed area being bounded within the fuselage by lateral straight lines that connect the intersections of the leading and trailing edges of the stabilizer with the sides of the fuselage, the fairings and fillets being ignored.

horn (aer) A short lever attached to a control surface of an aircraft, to which the operating wire or rod is connected. (aut) The curved inlet tube of a carburetor

horn (rad) An acoustic transducer consisting of a tube of varying sectional area

horning (ship) Setting the frames of a vessel square to the keel after the proper inclination to the vertical due to the declivity of the keel has been given.

horn timber (ship) The after deadwood (often called counter timber) fastening the shaft log and transom knee together

horsepower A unit of power, a measure of how fast work is being done. Several values have been assigned to this unit. The one used in England and America is the "Watts horsepower." It is defined as 550 foot-pounds per second at sea level and 50° latitude. The Watts horsepower is 1 0139 times the French horsepower See foot-pound.

Hotchkiss drive (aut) An axle drive system in which axle torque reactions are absorbed by the springs.

hot-short (metal). Said of metal which is brittle in the hot state.

hot-wire instrument (el) An instrument which depends for its operation on the expansion by heat of a wire carrying a current. The hot-strip instrument differs from the hot-wire instrument only in having a metallic strip in place of a wire

housed joint (carp) A joint in which a piece is grooved to receive the piece which is to form the other part of the joint.

hub dynamometer (aer) A device built into a propeller hub for measuring the engine thrust and/or torque

huck (text) A fabric made of cotton, linen, or combination of these with a small, figured design Used for towels. Also called "huckaback"

huckaback (text) See huck.

hull (ship) The body of a vessel, not including its masting, rigging, etc.

hull down (nav) Said of a vessel when, due to its distance, only the spars are visible.

humic acid (chem) Alkali soluble organic matter of soils It may be derived from lignin and may contain nitrogen.

humidity (met) A generalized term referring to the amount of water vapor present in the air See also absolute humidity, relative humidity

humidity mixing ratio (met) Parts of water per 1,000 parts of air

hump (RR) An inclined gravity track in a railroad yard.

hump signal (RR) A signal located at the hump to designate to the engineman information in connection with the direction and speed of movements toward the hump

hump speed (aer) The speed of a seaplane during take-off at which the float resistance reaches a maximum

hunting (aut) Erratic engine operation, caused by the inability of a governor to respond accurately to changes in engine speed

hurricane deck (ship) The uppermost deck, the deck where boats are stowed.

Hycar (chem) Trade name for a synthetic rubber which is said to be a butadiene copolymer It is a thermosetting material and available in crude sheet form ready for compounding into any type of stock. Used for hose printing rolls, general mechanical goods, gaskets, tubing, bumpers, vibration insulators, and packings

hydramatic drive (aut) A four-speed automatic transmission in conjunction with fluid drive It is contained in a case bolted to the back of the liquid coupling housing and consists of three planetary gear trains, two brake bands, two disk clutches, two oil pumps and a governor Two of the planetary units provide the four forward speeds and are engaged and disengaged by the brake bands and disk clutches The brake bands and disk clutches are operated by pistons actuated by oil pressure through valves jointly controlled by the position of the throttle and the governor The third planetary unit provides the reverse speed and is engaged manually by means of a dog clutch Neutral is used when the engine is started Driving is ordinarily done in the high range where all four forward speeds are available

hydrated lime See slaked lime

hydration (chem) A special case of solvation, where water is the solvent.

hydraulic analogy (el) A method of explaining electrical theory by using the flow of water for an example

hydraulic brakes (aut) Extensively used on passenger cars and light or medium weight trucks Use of the brake pedal develops pressure in a master hydraulic cylinder By hydraulic principles this pressure is increased and applied to each of the wheel cylinders through a system of brake tubes The wheel cylinders are fitted with operating pistons that convert the hydraulic pressure into the mechanical power which expands the brake shoes As soon as the pedal pressure is released, the return springs of the brake shoe act against the wheel cylinder pistons, forcing the brake fluid back into the master cylinder

hydraulic clutch (aut) A clutch which uses fluid to transmit drive or torque.

hydraulic jack. A jack for lifting, pressing, etc., in which pressure on the moving part is transmitted by a liquid, such as water or oil.

hydraulic press A machine utilizing Pascal's law of pressure exerted on confined liquids It consists essentially of a hydraulic piston, a ram, and an anvil. Used in metal working, etc.

hydraulics The pressure application of liquids in the transmission of power

hydrochinone (phot) See hydroquinone.

hydrofoil (aer) Any surface designed to obtain reaction from the water through which it moves Also called hydrovane

hydrogen (H) A colorless, odorless, and tasteless gas, the lightest substance known At. wt. 1 0078, at. no 1, m.p -257° C, sp gr 0 0695

hydrogenation (1) Process of decomposition of oil by cracking at high pressure and temperature in the presence of a catalyst in an atmosphere of hydrogen (2) A process which was originated in 1913 by Bergius It is found that a mixture of coal and oil when heated to 85 degrees F in an atmosphere of hydrogen under a pressure of 2,000 pounds per square inch, will yield fully saturated compounds of carbon and hydrogen. It is claimed that by this process, a barrel of gasoline can be produced from a barrel of crude oil

hydrogen electrode (chem) A metallic electrode which has been coated with a thin layer of platinum black, and exposed to an atmosphere of hydrogen long enough for the platinum black to become saturated with hydrogen It behaves as though it were an electrode made of hydrogen, and is used for conveniently and accurately measuring hydrogen ion concentration.

hydrograph (met) An instrument designed to record the atmospheric humidity

hydrolysis (chem) The addition of water to a compound causing it to split into two parts, one part chemically reacting with the H of the water and the other part with OH

hydromatic welding A resistance welding process wherein each one of two or more electrodes in sequence goes through a complete welding cycle under the control of a hydraulic sequencing device synchronized with a welding current control device

hydrometallurgy A branch of metallurgy which deals with the extraction of metals from their ores by the use of aqueous solvents

hydrometeors (met) Particles or bodies of liquid water which fall through the air

hydrometer (chem-phy) An instrument for measuring the specific gravity (density) of liquids.

hydroplane (aer) See plane.

hydroquinone (phot) A chemical which occurs in white, needle-like crystals It is a powerful developing agent yielding images of great density Also known as hydrochinone, hydrokinone, or quinol.

hydrosol (chem) An aqueous colloidal solution

hydrostatic balance. A balance for weighing substances in water to ascertain their specific gravity

hydrostatic pressure The pressure exerted by a liquid at rest.

hydrovane (aer) See hydrofoil.

hydroxide (chem). A compound of an element with the radical or ion, OH, as sodium hydroxide, NaOH.

hygrometer (chem-met) An instrument for measuring the percentage of moisture in air or in other gases.

hygroscopic (chem) Said of any substance which readily absorbs moisture or has a particular affinity for moisture

hyperfocal distance (phot) The distance from the lens beyond which all objects will be in fairly sharp focus and which will give the maximum depth of definition

hypo (phot) The abbreviation of the term sodium hyposulphite, or more correctly, sodium thiosulphate, used for fixing films, plates and paper

hypoid gearing (aut) A comparatively recent development in final (axle) drives In a hypoid gear the axis of the pinion gear is either above or below the center line of the bevel gear Its principal advantages are greater tooth area in contact, quieter operation, and increased chassis clearance above the propeller shaft. This increased clearance permits construction of vehicles with the chassis closer to the ground

hypo test (phot) A test for the presence of hypo in the washing water of films or prints The test solution consists of potassium permanganate, sodium hydroxide and distilled water, and is violet in color If hypo is present the violet will change to orange and the orange to yellow

hysteresis (StM) The persistency with which certain bodies tend to retain their original condition.

hysteresis loop (el) A hysteresis loop for a magnetic material in a cyclicly magnetized condition is a curve (usually with rectangular coordinates) showing, for each value of the magnetizing force, two values of the magnetic induction, one when the magnetizing force is increasing the other when it is decreasing

I

I-beam (ship) A steel beam with cross section like the letter "I."

icing (met) The accumulation of ice, i e., glaze, over exposed objects The accumulation of ice over aircraft in flight.

ideal gas (chem-phy) Sometimes called "perfect gas" A gas which conforms to the characteristic equation of a gas $pv = RT$, where p is the pressure and v the volume at a given temperature, T is the absolute temperature, and R is $\frac{p_o v_o}{273}$ (centigrade), where p_o is the pressure at absolute zero and v_o is the volume at absolute zero

identification lights (aer) A group of lights, clear and colored, carried on the rear part of an airplane for identification at night.

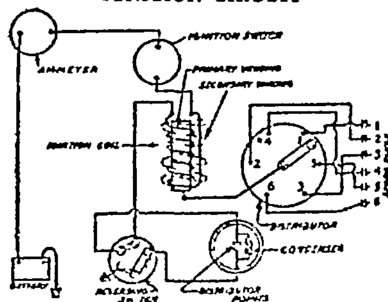
identity (alg) An equation which is satisfied by all values of the literal numbers for which the two sides have any real meaning That is, the result obtained from the four fundamental operations with two expressions is identically equal to the indicated combination of the numbers

idler gear (aut) A gear placed between a driving and a driven gear to make them rotate in the same direction. It does not affect the gear ratio

idling (aut) Said of an engine running without load at the slowest speed possible without stalling

ignition system (aut) An ignition system for internal combustion engines is a method of electrically igniting the compressed combustible mixture in the engine cylinders. This may be accomplished electrically by the use of spark plugs and high-tension magneto, together with necessary wiring, or by electric energy from a storage battery together with suitable interrupting mechanism, induction coil, etc For internal combustion engines of the Diesel type using oil as fuel, the heat of compression ignites the combustible mixture

IGNITION CIRCUIT



(Courtesy General Motors Corporation)

I head (aut) This term is applied to a type of engine and refers to the arrangement of the valves on the head of the cylinders in a valve in-head engine.

illuminated wind cone (aer) A flexible illuminated wind indicator having the form of a truncated cone and so supported as to be affected by the action of the wind so as to indicate by its position the direction and the approximate velocity of the wind.

illumination (el) The density of the luminous flux on a surface, it is the quotient of the flux by the area of the surface when the latter is uniformly illuminated The term "illumination" is also commonly used in a qualitative or general sense to designate the act of illuminating or the state of being illuminated Usually the context will indicate which meaning is intended, but occasionally it is desirable to use the expression "amount of illumination" to indicate that the quantitative meaning is intended.

image (phot) The picture on a negative, on enlarging paper, or as seen on the ground glass focusing screen

imbibition (phot) A method of printing by dye-transfer, used in color photography

imbibition paper (phot) A gelatin-coated paper treated so that when placed in contact with a dye-soaked matrix, the dye will leave the matrix and transfer to the gelatin of the paper Used in the "wash-off relief process" of color photography

imbibition pressure (chem) The pressure against which a colloid will imbibe a liquid, or conversely, that pressure which will be needed to force the dispersions medium out of a gel, or similar colloid

impact pressure (aer) The pressure acting at the forward stagnation point of a body, such as a pitot tube, placed in an air current. Impact pressure may be measured from an arbitrary datum pressure

impact test (StM). A test for the strength or hardness of a material or structural member, employing a sudden blow or shock.

impact value (StM) Indicates the shock-resisting qualities of material. It is of particular value in ascertaining the influence of heat treatment. Impact value depends on the form of the specimen.

impedance (el) The impedance of a portion of an electric circuit to a completely specified periodic current and potential difference is the ratio of the effective value of the potential difference between the terminals to the effective value of the current, there being no source of power in the portion under consideration

impeller (aut). The rotating part of a blower or pump which imparts motion to air or a liquid by forcing it outward from the center of the part.

imposition (print) The operation of laying a number of pages or parts of a form in such a manner that, when the sheet is printed and folded the pages or parts will follow each other in consecutive order with proper margins

impregnation (chem) The absorption of one substance by another

impulse excitation (rad) A method of producing oscillatory current in a circuit in which the duration of the impressed voltage is relatively short compared with the duration of the current produced

in block (aut) Said of two or more cylinders cast as one piece, i.e., 2, 4, 6, 8 cylinders cast "in block"

inboard (ship) From the side to the center of ship

inboard stabilizing float (aer) A stabilizing float placed relatively close to the main float or hull of a seaplane.

incandescent Made luminous or visible by heat. Carbon particles in a flame the filament of an electric light and the mantle of a Welsbach gas burner become incandescent and give off light.

inching (el) See *jogging*

incidence wire (aer) See stagger wire.

inclinometer (aer) An instrument that measures the attitude of an aircraft with respect to the horizontal

independent springing (aut) Where "knee action" or similar methods of independent springing are used, the center section of the axle, as well as the entire axle structure, is sometimes eliminated. The load is passed from the frame to

India ink. A deep black writing and drawing ink, used especially in drawings to be photographed for engravings It is made of lamp-black and size or glue It owes its name to the fact that it was first obtained from China through India.

India paper A very thin but strong paper imported from Europe It is made by a secret process chiefly from linen rags treated and blended with a superior grade of flax, hemp, and other materials It has a silky, soft texture and takes ink nicely. A thousand sheets measure less than an inch in thickness.

indicated absolute altitude (air nav) The height above the earth's surface read on the altimeter when set to read altitude above the earth's surface.

indicated air speed (air nav) The reading of the air speed indicator

indicated altitude (air nav). The height above sea level as read on the altimeter

indicated horsepower (i hp) Total power developed by the engine, or brake horsepower (b hp) added to friction horsepower (f hp). Example if an engine tested at 2,000 r p m's develops 34 b hp and 26 f hp., it would be rated as having 60 indicated horsepower at 2,000 revolutions per minute

indicated pressure altitude (air nav) The reading of the altimeter when the correction table is set to read zero feet or 29 92 inches of mercury

indicating instrument (el) An instrument in which the present value of the quantity measured is indicated by the position of a pointer relative to a scale.

indicating lamp (el) A small lamp used in connection with the control system of a circuit breaker or other device to indicate the position of the device or condition of the circuit.

reaction, i e, pH, etc.

indicator light (aer) An indicator light is a light, used in association with a control, which by means of position or color indicates the functioning of the control Also called control light and pilot light

indigo (chem) The dyestuff of the *glycoside indican* found in indigo where it exists in a reduced form

indigotin (chem) A synthetic indigo dye manufactured from naphthalene a coal-tar product.

individual fin and tube core (aut) A radiator consisting of an assembly of fluid tubes of any cross-sectional form, to each of which are attached gills or fins of circular, square, or other shape, each tube and its fin or fins forming a separate unit

induced angle of attack (aer) The difference between the actual angle of attack and the angle of attack for infinite aspect ratio of an airfoil for the same lift coefficient

induced drag (aer) That part of the drag induced by the lift.

inductance (el) The (scalar) property of an electric circuit, or of two neighboring circuits, which determines the electromotive force induced in one of the circuits by a change of current in either of them

induction brazing (weld) An electric brazing process wherein the heat is obtained from an induced current See also brazing

induction coil (el) A transformer with open magnetic circuit which is excited by an interrupted or variable current. Also called "coil," "spark coil," "Ruhmkorff coil"

induction coil (tp) A transformer used in a telephone set for the interconnection of the transmitter, receiver and line terminals

induction compass (aer) A compass, the indications of which depend on the current generated in a coil revolving in the earth's magnetic field See also earth inductor compass

induction generator (el) An induction machine driven above synchronous speed by an external source of mechanical power

induction instrument (el) An instrument which depends for its operation on the reaction between a magnetic flux (or fluxes) set up by one or more currents in fixed windings, and electric currents set up by electromagnetic induction in conducting parts of the moving system.

induction motor (el) An induction machine which converts electric power delivered to the primary circuit into mechanical power The secondary circuit is short-circuited or closed through a suitable circuit.

induction voltage regulator (el). A device having a primary winding in shunt and a secondary winding in series with a circuit for gradually adjusting the voltage or the phase relation of the circuit by changing the relative position of the primary and secondary windings of the regulator

inductive coupling (rad) The association of one circuit with another by means of inductance mutual to the circuits This term when used without modifying words, is commonly used for coupling by means of mutual inductance, whereas coupling by means of self inductance common to the circuits is called direct inductive coupling.

inductor (el). A device, the primary purpose of which is to introduce inductance into an electric circuit.

inertia (phy) Newton's First Law states that a body at rest tends to remain at rest and a body in motion tends to remain moving at the same speed and in the same direction. The stationary body will remain stationary unless acted upon by some force The body in motion will remain moving at a constant speed and in the same direction unless acted upon by some force This tendency of a body to remain in its same condition of rest or motion is called inertia. The force with which the body offers resistance to a change in its state of rest or motion is called the inertia force or *force of inertia*. Since a force is required to overcome the force of inertia, if a body, which has been at rest, begins to move, this movement shows that a force has been applied to the body If a body has been moving steadily in a certain direction and either the speed or the direction changes, a force must have been applied to cause this change

infinity (phot) A lens is said to be set for infinity when focused at a point beyond which all objects are sharply defined

inflation net (aer) A rectangular net of cordage, used to restrain the envelope of a kite balloon or nonrigid airship during inflation. Also applied to a free-balloon net designed to be removed after inflation.

inflation sleeve (aer) A tubular fabric attachment to an envelope or gas bag, serving as a lead for the inflation tube

inflow (aer) The flow of air into a propeller.

influence machine (el) See *electrostatic generator*

infra-red rays (phy) Invisible rays beyond the red end of the solar spectrum Light having a wavelength longer than the visible, i.e., over 7000 Angstrom units

infusorial earth (chem) A natural substance containing a high percentage of silica, extremely porous, and used as a refractory. Sometimes called "kieselguhr".

ingot (metal) A steel casting, usually rectangular in section, intended for rolling or forging To be distinguished from a "casting", which is intended for machining

inherent stability (aer) Stability of an aircraft due solely to the disposition and arrangement of its fixed parts, i e, that property which causes it, when disturbed, to return to its normal attitude of flight without the use of the controls

or the interposition of any mechanical device.

in irons (nav) Caught by the wind so that a turn cannot be made in either direction

initial voltage (el) The initial voltage of a battery is the closed-circuit voltage at the beginning of a discharge It is usually measured after the current has flowed for a sufficient period for the rate of change of voltage to become practically constant.

injection (aut) The forcing of fuel oil into the combustion chamber of a Diesel engine by means of high pressure.

ink. The colored fluid used in writing, printing, stamping, etc. Common black ink is a chemical dye generally of nutgalls, copperas, and gum arabic. The coloring matter is gallotannate of iron, logwood is used to deepen and improve the color, and many other ingredients are sometimes used Printing ink is a mixture of boiled oil and black and colored pigments Unlike writing ink, which is fluid, printing ink is of the consistency of a thick paint Linseed and nut oils are used for the finer printing inks, while rosin is used for the cheaper grades

ink knife. For handling printing ink, as in taking it from a can or barrel, it has a handle and usually a blade with a square or round end. An "ink slice" is an iron implement for lifting or scraping up ink.

in line (aut) The term generally applied to a gasoline engine having a single bank of cylinders arranged in a line, one behind the other

inner bottom (ship) The top of a double bottom The tank top

inner stringer bar (ship) Any angle bar or flat bar on the inner part of a stringer plate

inside calipers (mach) Tools with curved legs used for measuring inside diameters, such as the diameters of hole, the distance between two surfaces the width of slots, and other similar jobs To measure the inside diameter of a hole with inside calipers, first set them approximately to the size of the hole then, holding one leg against the wall of the hole, adjust the other leg until it just touches the point exactly opposite The dimension can then be determined with a rule or a micrometer

inside strake (ship) A strake, the edges of which are overlapped by those of the outside strakes.

insolation (met) Solar radiation

inspection light (aut) A portable lighting unit connected by extension cord to the lighting system of the vehicle

inspection window (aer) A small transparent window fitted in the envelope of a balloon or airship, or in the wing or fuselage of an airplane, to allow inspection of the interior

instability (met) A state of the atmosphere which permits vertical motions of isolated air parcels.

instrument (el) A device for measuring the present value of the quantity under observation. An instrument may be an indicating instrument or a recording instrument. The term "instrument" is used in two different senses; (a) instrument proper and (b) to include not only the instrument proper but, in addition, any necessary auxiliary devices, such as shunts, shunt leads, resistors, reactors, capacitors, or instrument transformers The term "meter" is also used in a general sense to designate any type of measuring device including all types of electric measuring instruments Such use as a suffix or as part of a compound word (e g, volt meter, frequency meter) is universally accepted. "Meter" may be used alone with this wider meaning when the context is such as to prevent confusion with the narrower meaning of "electricity meter"

instrument flying (aer) The art of controlling an aircraft solely by the use of instruments Sometimes called "blind flying"

instrument lamp (aer). A device designed to be used on board an aircraft to illuminate or irradiate an instrument or instruments.

instrument light (aut) A lighting unit mounted on the instrument board and intended to illuminate instruments

insulation A protective covering on wires or electrical parts to prevent short circuits, or on pipes to prevent temperature changes

insulation (el) Material having the property of an insulator used to separate parts of the same or different potentials *Class A insulation* consists of 1 cotton, silk, paper, and similar organic materials when either impregnated or immersed in a liquid dielectric, 2 molded and laminated materials with cellulose filler, phenolic resins and other resins of similar properties, 3 films and sheets of cellulose acetate and other cellulose derivatives of similar properties, 4 varnished (enamel) as applied to conductors *Class B insulation* consists of mica, asbestos, fiber glass and similar inorganic materials in built-up form with organic binding substances. A small proportion of class A materials may be used for structural purposes only *Class C insulation* consists entirely of mica, porcelain, glass, quartz and similar inorganic materials *Class O insulation* consists of cotton, silk, paper, and similar organic materials when neither impregnated nor immersed in a liquid dielectric.

insulator (el) A material of such low conductivity that the flow of current through it can usually be neglected

insulator arcing horn (el) A metal part placed at one or both ends of an insulator or of a string of insulators for the purpose of reducing or eliminating damage by arcover to the insulator and/or conductor

intaglio (print) Engraving incised or cut into the surface of wood or metal, in distinction from engraving in relief The lines to be printed are filled with ink and the paper pressed in to take up the ink

intaglio printing (print) The process of printing from intagliotype plates, or from incised engravings on steel or copper plates, also called "Die Stamping"

intake header (aer) A short duct extending from outside the engine cowling to the supercharger intake

integer (math) A whole number, a number that is not a fraction.

integral calculus (math) The study of integration as such and its application to finding areas, volumes, centroids, equations of curves, solutions of differential equations, etc

intensification (phot) Increasing the intensity of a negative or print by the use of chemical solutions

intensifying screen (radiography) A layer of a material which is placed in contact with the film for the purpose of increasing the effect of the radiation on the film

intercept bearing (air nav) The bearing that must be maintained in order to intercept another moving object.

intercept heading (air nav) The direction of the longitudinal axis of an aircraft to make good a given intercept course

interceptor (aer) A lateral control device consisting of a small plate placed just back of a wing slot to spoil the effect of the slot at high angles of attack. (cf spoiler)

intercept speed (air nav) The rate at which the distance between two moving objects is being reduced

intercept track (air nav) The track flown by an aircraft over the earth's surface from a known position to a moving object.

intercostals (ship) Plates which fit between floors frames, or beams, as stiffeners.

interference (aer) The aerodynamic influence of two or more bodies on one another

interference (rad) In radio communication interference is disturbance of reception due to strays or undesired signals

interlock (el) A device actuated by the operation of some other device with which it is directly associated, to govern succeeding operations of the same or allied devices Interlocks may be either electrical or mechanical

interlocking (RR) An arrangement of switch, lock, and/or signal appliances so interconnected that their movements must succeed each other in a predetermined order

intermediate beams (ship) Beams placed between deck beams, if the spacing of the latter is unusually large

intermediate frames (ship) Those frames in a cellular double bottom to which no floor plates are connected.

intermediate frequency (in superheterodyne reception) A frequency resulting from the combination of the received frequency and the locally-generated frequency and usually equal to their difference.

intermediate longitudinal (aer) A light longitudinal girder between main longitudinals of a rigid airship, primarily intended for support of the outer cover

intermediate transverse (aer) An open unbraced transverse frame of a rigid airship between two main or braced transverse frames

intermittent light (aer) A light which has alternate dark and light intervals, when viewed from a fixed point.

intermittent weld A weld whose continuity is broken by unwelded spaces

intermodulation (rad) The production, in a nonlinear circuit element, of frequencies corresponding to the sums and differences of the fundamentals and harmonics of two or more frequencies which are transmitted to that element

internal resistance (el). The internal resistance of a cell or battery is the resistance within the cell or battery to the flow of an electric current and is measured by the ratio of the change in voltage at the terminals of the cell or battery corresponding to a specified change in current for short time intervals

international ampere (el) Defined as the current which will deposit silver at the rate of 0 00111800 gram per second. Experimental results show that one international ampere equals 0 99985 absolute ampere

international coulomb (el) The quantity of electricity which passes any section of an electric circuit in one second, when the current in the circuit is one international ampere One international coulomb equals 0 99985 absolute coulomb

international farad (el) The capacitance of a capacitor if a charge of one international coulomb produces a potential difference between the terminals of one international volt One international farad equals 0 99952 absolute farad.

international henry (el) The inductance which produces an electromotive force of one international volt when the current is changing at the rate of one international ampere per second. One international henry equals 1 00048 absolute henrys

international joule (el) The energy required to transfer one international coulomb between two points having a potential difference of one international volt. One international joule equals 1 00018 absolute joules

international ohm (el) Defined as the resistance at zero degree centigrade of a column of mercury of uniform cross-section having a length of 106.300 centimeters and a mass of 14 4521 grams. Experimental results show that one international ohm equals 1.00048 absolute ohms

international volt (el) The voltage that will produce a current of one international ampere through a resistance of one international ohm One international volt equals 1 00033 absolute volts

interpolation (math) The process of inserting intermediate terms in a mathematical series.

interrupted continuous waves (rad) Interrupted continuous waves are waves obtained by interruption at audio frequency in a substantially periodic manner of otherwise continuous waves

interruptor (el) (Break of an induction coil) A device for interrupting the primary current mechanically or otherwise.

in the gray (text) Unbleached, or undyed, cotton or linen cloth.

in the grease (text) Wool as it leaves the sheep's back before scouring

in the gum (text) Silk in its raw or natural state before degumming It contains sericin (silk gum) which makes it stiff and dull.

introscope (instr) An instrument for the inspection of the inside of closed objects such as pipes

Invar (metal) Trade name for a special nickel steel having a low coefficient of expansion and hence employed in the manufacture of precision instruments.

Invar tapes (surv). Those made of special nickel steel and very little affected by extreme changes of temperature. Their coefficient of expansion is only one-tenth or less than that of ordinary steel tapes (about 0 00000056 per degree of Fahrenheit) They are intended only for precise base line measurements and carry only the end marks and one or two intermediate marks Invar tapes come in lengths of 60 100, and 150 feet, and 30 and 60 meters. The shortest lengths are most used They are usually well protected on iron or wooden reels

inverse square law (phy) The amount of light received on a surface of given area from a given source of light is inversely proportional to the square of the distance from the source to the surface

inversion (met) A layer of air in which the temperature increases, i e., is inverted. An inversion of dewpoint, likewise, is a layer in which the dewpoint increases instead of decreasing

inverted flight (stress analysis) A loading condition for the wing simulating the conditions of flying upside down and of commencing a dive. cf dive (stress analysis)

inverted normal loop (aer) A loop starting from inverted flight and passing successively through a dive, normal flight, climb, and back to inverted flight.

inverted outside loop (aer) An outside loop starting from inverted flight and passing successively through a climb, normal flight, dive, and back to inverted flight.

inverted spin (aer) A maneuver having the characteristics of a normal spin except that the airplane is in an inverted attitude

invert sugar (chem) A mixture of glucose and fructose obtained by acid hydrolysis of sucrose, so named because the optical rotation is inverted from dextro to levo after hydrolysis.

invisible rays (phy) Rays of light beyond both extremes of the visible spectrum. Beyond the red extreme they are known as infra-red rays, beyond the violet extreme as ultra violet.

iodine number (chem) The number of grams of halogen, calculated as iodine, which 100 grams of fatty acid or other fatty substance or any unsaturated compound will take up, it is a measure of the degree of unsaturation

ion (el) An electrified portion of matter of subatomic, atomic or molecular dimensions One of the electrically-charged particles that make up an electrolyte.

ion activity (chem) The ion activity of any species of ion is equal to the "thermodynamic ion concentration", i e, the ion concentration corrected for the deviations from the laws of ideal solutions.

ion antagonism (chem) The mutual undoing of effects of various ions, e.g., calcium vs sodium, magnesium vs. calcium, potassium vs sodium

ion concentration (chem) The ion concentration of any species of ion is equal to the number of those ions, or of mols or equivalents of those ions contained in a unit volume of an electrolyte.

ionization (el) The process of producing ions

ionization constant See dissociation constant.

ion migration (el) A movement of ions produced in an electrolyte by the application of an electric potential between electrodes

ionogen (el-chem) A substance which when dissolved in a specified medium (usually water) produces an electrolyte

ionosphere (met) The very high levels of the atmosphere, in which the gases are more or less ionized, due to the low pressure It is more than sixty miles high above the stratosphere

IR drop (el) The IR drop in an electrolytic cell is equal to the product of the current passing through the cell and the resistance of the cell.

iron (Fe) Seldom found in the pure state in which it has a silvery white color Its most common occurrence is as an oxide Nearly pure iron is found in meteorites and can also be produced by the electrolytic process At. wt. 55 84, at. no 26, m p 1530° C, sp gr 7 84-8 139

iron ochre (chem) See ochre.

iron pyrites (chem) (FeS_2) A low-content iron ore used in the manufacture of sulphuric acid. Also known as "fool's gold"

irrational number (alg) One not equal to the quotient of any two entire quantities

isallobar (met). A line drawn on a weather map along which the fall or rise in pressure is the same

isinglass The inner membrane from the swimming bladder of certain species of sturgeon and hake, consisting chiefly of glutin

isobar (met) A line drawn on a weather map along which the atmospheric pressure, reduced to sea-level or some other level, is the same

isocandle line (el) A line plotted on any appropriate coordinates to show directions in space, about a source of light, in which the candlepower is the same. The line, for a complete exploration, is a closed curve

isochromatic (phot) See orthochromatic.

isoelectric point (chem) The isoelectric point of a colloid is that condition in which the colloid is electrically neutral with respect to the surrounding medium. The hydrogen ion concentration at which the undissociated residue of an amino acid is a maximum, and at which the sum of the ions is minimal It is that concentration at which there will be a tendency for as many cations to migrate to the cathode, as anions to the anode

isolux line (el) A line plotted on any appropriate coordinates, showing points of equal illumination The line, for a complete exploration, is always a closed curve.

isomerism (chem) A change in the properties of a compound without change of state or of composition, due to a change in the number or arrangement of atoms in a molecule

isometric drawing (draw) This type of drawing takes as its points of departure three axes known as the isometric axes The dimensions of the object to be drawn are marked off on these axes Through the points marked off, lines are drawn parallel to the isometric axes It is to be noted that angles in isometric drawings do not show their true size and therefore cannot be measured in degrees Circles appear as ellipses in isometric drawings

isotherm (met) A line drawn on a map

through places having equal temperatures

isothermal (met) A state of the atmosphere, or a layer thereof, in which the temperature remains unchanged with altitude

isotope (chem) A variant of an element having identical chemical properties as the original element but atoms of different atomic weight.

isotropic body (phy) A body in which the value of any given property is independent of the direction of measurement. A body may be isotropic with regard to one or more physical properties when it is not isotropic for others

J

jack (text) See lever.

jack (rad-tp) A connecting device to which the wires of a circuit may be attached and which is arranged for the insertion of a plug The jacks most generally used have three separate contacting parts the tip spring, the ring spring, and the sleeve, which make contact with the corresponding parts of the plug

jacket (battery) The jacket of a dry cell is a cylindrical covering of insulating material, closed at the bottom

jack ladder (ship) A ladder with wooden steps and side ropes

jack plane (carp) A plane which, except for its length, is similar to the fore plane and is used for the same type of work It varies in length from 11 and ½ to 15 inches, its blades are 1 and ¾ to 2 and ⅝ inches wide. Since it is shorter than the fore plane, it will not perform work as precisely Used to true a surface or edge of lumber

jack rafter (bldg) A short rafter framing between the wall plate and a hip rafter

jack shaft (aut) An intermediate driving shaft.

jackstay (aer) A longitudinal rigging provided to maintain the correct distance between various parts in the fittings of an aerostat.

Jacob's ladder (ship) A rope ladder with wooden rounds

jamb (carp) The side piece or post of an opening, sometimes applied to the door frame.

japan (paint) A varnish made by dissolving shellac in hot linseed oil, with the addition of litharge as a drier

jar (el) A glass or composition container for the element and electrolyte of a lead-acid storage cell

jersey (text) A general term given to plain-knitted material used for garments. May be cotton, wool, silk, rayon, or a mixture of fibers. Great variety of weights, qualities, and colors Used for underwear, blouses, gowns, suits, coats, etc.

Jersey pine (also known as scrub pine because of the high altitudes at which it grows) Yellow to brownish red in color, hard but brittle Used for rough lumber, paper pulp, and charcoal

jet (aut) A metered opening in an air or fuel passage to control the flow of air or fuel A jet tube or spray nozzle which sprays the gasoline into the mixing chamber of a carburetor

job compositor (print) One who does all or many varieties of work, as distinct from a book or newspaper hand.

job font (print) A small assortment of type of one style and size, commonly used for display and miscellaneous work It contains capitals, lower-case letters, figures, points, etc., but no small capitals

job press (print) A small press, commonly of the platen type, upon which small jobs are done.

job printer (print) A printer doing mostly jobwork

jogger (print) An arrangement attached to the delivery board of a press, to keep the sheets in order as they are laid down by the fly, tape, or grippers. It consists of small movable uprights on two or three sides of the area where the sheet is delivered. These uprights move back and forth automatically as each sheet is laid down and thus keep the pile straight.

jogging (el) The quickly repeated closure of the circuit to start a motor from rest for the purpose of accomplishing small movements of the driven machine Also called inching

joggle (ship) To lap a joint by keeping one edge straight and bending the other in order to leave both surfaces even on one side An offset in a plate, the depth of which is equal to the thickness of the plate forming the lap

joint (carp) See butt joint, lap joint, mortise and tenon joint, etc.









Tongue and groove Joint



Dado Joint

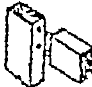


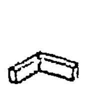


End Lap Joint



Edge Cross Lap Joint













joists (carp) Timbers supporting the floor boards.

joule (el) A unit of energy or work equal to a watt second A joule is ten million (10^7) ergs One calorie of heat requires the expenditure of 4.18 joules of mechanical work.

journal (aut) The finished part of a shaft or axle which rotates in or against a bearing

journeyman. One who has finished his apprenticeship Several hundred years ago this title was given to a workman who journeyed from place to place in order to acquire a full knowledge of his trade.

jumper (el) A short length of conductor used to make a connection between terminals or around a break in a circuit, or around an instrument. It is usually a temporary connection.

jumper (RR). A conductor used to make electric connection between terminals, or around a break in a circuit. As applied to vehicles it usually consists of two electric coupler plugs with connecting cable although sometimes one end of the connecting cable is permanently attached to the vehicle.

jump spark (aut) A spark jumping or bridging a gap in a high voltage circuit.

junction box (el) 1. An enclosed distribution panel for connecting or branching one or more corresponding electric circuits without the use of permanent splices 2. A metal box with a blank cover which serves the purpose of joining different runs of conduit, tubing, wireway or other raceway, and provides space for the connection and branching of the enclosed conductors.

jury mast (nav) A temporary mast rigged in place of one lost or broken

justify (print) To make lines of type of exact length with their mates, so that they will lock up solidly This may be done by spacing between or within words, or at the ends of lines. To space a line is to put proper spaces between

words or letters A line may be well justified but badly spaced and vice versa

jute (paper) Originally an Asiatic herb, but now grown in other countries In America, the Indian Mallow, the fiber of which is used by manufacturers of coarse sacking bags, and gunny Raw material used by paper-makers is the old gunny and sacking

jute board (paper) A fibrous board, sometimes grained or marbled by printing, used as a cover on cut-flush books Raw material obtained from old gunny and sacking

jute manila (paper) A manila wrapping paper produced from jute and manila clippings.

K

kaolin (min) A substance found naturally, produced by the weathering of feldspathic rocks, and consisting of silicate of alumina. The term is now applied to any kind of porcelain clay which does not dissolve in the process of firing It is a grayish-white, inert powder which is insoluble in water and dilute acids Used as a filler in ceramics, paper, textiles, rubber, and pencils.

katabatic (met) Shallow but sometimes strong surface winds blowing downhill. They result from nocturnal cooling of a shallow surface layer of air, and are not necessarily associated with a wind system

keel (aer) The assembly of members at the bottom of the hull of a semirigid or rigid airship, which provides special strength to resist hogging and sagging and also serves to distribute the effect of concentrated loads along the hull.

keel (ship) The "backbone" of a ship A series of connected plates running fore and aft on the bottom of the center line of the ship Also the principal timber of a small boat, extending from stem to stern at the bottom of the hull and supporting the whole frame.

keel blocks (ship) Blocks on which the keel of a vessel rests when being built, or when she is in dry dock.

keelson (ship) A vertical strake of plates on the keel at the center line, running fore and aft from stem to stern. It is sometimes called the center line girder or center keelson

keel stop (ship) A small metal fitting on the keel, at the after end, to act as a stop in locating the boat in a fore-and-aft position on the keel rest when stowing the boat in the cradle.

keeper (phot) A chemical used in developing agents in solution to prevent them from oxidizing Examples potassium metabisulphite, sodium bisulphite.

Kelvin (phy) A temperature scale whose zero point lies at absolute zero, i.e., -273° C. Same as absolute temperature.

kemp (text) The coarse, dead or diseased wool fibers in fleece. They do not dye.

Kennametal (metal) A trade name for an alloy of tungsten, titanium, and carbon. It is useful as a material for machine tools It may also be used for oil pump valves, valves for high pressure hydrogenation of coal, nozzles for spraying abrasive and corrosive powders and liquids.

kentledge (metal) Pig iron used as ballast on a vessel.

Kentucky coffeetree (wood) A soft but durable wood used in cabinet making

kerf (carp). The cut made by a saw

kerf (weld) The space from which the metal has been removed by a cutting process

kerosene A mixture of hydrocarbons, freed on the one hand from gasoline or naphtha and on the other hand from the heavy hydrocarbons that belong to gas oil and lubricating oil. It is usually the fraction or cut of petroleum which dis

tills between 150° to 300° C., and has been purified by treatment with sulphuric acid and alkali and occasionally filtered through Fuller's earth.

Kerr electrostatic effect. See electro-optical effect.

kersey (text) A thick, woolen cloth similar in construction to melton, but finished with a short thick nap May contain cotton warp with wool filling, or have cotton mixed with wool in yarns. Much like a heavy broadcloth Used for uniforms and overcoats. Weave is twill or double plain.

ketch rig (ship) A two-masted sailing rig with the larger sail forward It can be designed with either triangular or boom and gaff sails The jigger mast is stepped forward of the tiller, thus differentiating it from the yawl rig which has the jigger mast stepped abaft the tiller

kettle stitch (book) The stitch is made at the head and tail of sewn books, a chain stitch. It is made by inserting the needle between the sections, making a loop, inserting the needle and fastening

keyhole saw (carp) See compass saw

keyseat rule (mach) A keyseat (or box) rule is the most convenient tool for drawing lines and laying off distances along curved surfaces. It has an angle bar shape. On one flat side of the angle bar is the scale, on the other two clamps to hold the rule to the round work.

khaki (text) A strong, twilled cotton material of tan color used for uniforms. Many weights and qualities Also used for summer suits and outdoor work clothes.

kieselguhr (chem) See infusorial earth.

kill (print) When the word is marked on copy or on proofs, it means that the stuff should be thrown away and is not to be used. A colored pencil is used for marking matter "killed."

kilocalory (chem-phy) A thousand calories. The term "large calory" is obsolescent. The term "kilogramcalory" is a misnomer

kilogram A unit of weight in the metric system, equal to 1,000 grams or 2.2046 pounds avoirdupois. It is the weight of a platinum rod preserved in Paris as the standard unit of the metric system of weights.

kilometer One thousand meters, approximately 3280 feet.

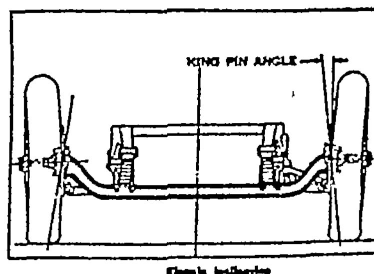
kilowatt (el) A unit of measure of electrical power equal to 1,000 watts (approximately 1 1/3 horsepower) See also watt.

kilowatt hour A unit of energy, 1000 watt-hours, a kilowatt of power used for one hour, approximately 4/3 horsepower acting for one hour

kinematics (phy) That part of mechanics which treats of different kinds of motion and of the modes of strains in elastic bodies without reference to the forces involved.

kinetic energy (phy) The energy which a mechanical system possesses by virtue of its motion. The kinetic energy of a particle at any instant is $mv^2/2$, where m is the mass of the particle and v is its path velocity at that instant. The kinetic energy of a body at any instant is the sum of the kinetic energies of its several particles.

kinetics (phy) That part of mecnanics which treats of the effect of forces in changing the motion of bodies.



[illegible]

(Courtesy General Motors Corporation)

kingpin (aut) A steel pin on which the steering knuckle pivots It passes through vertical poles in the front-axle

yoke and thus joins the steering knuckle to the axle Also called "steering-knuckle pivot."

king posts (ship) The main pillar posts of the ship Also called samson post A post or pillar forming support for a cargo boom.

kite balloon. An elongated form of captive balloon, fitted with lobes to keep it headed into the wind, it usually derives increased lift from the inclination of its axis to the wind

knee (ship) An angle or channel iron from deck beam to shell frame, serving as a bracket. A shaped timber for connecting construction members installed at an angle to each other Some knees are sawed from straight-grained wood, while in other cases the grain follows the natural bend of the tree at a limb or root.

knee action (aut) See independent springing.

knife file. A file whose cross section resembles the blade of a knife, thick at one edge thin or sharp at the other

knife switch (el) A form of air switch in which the moving element, usually a hinged blade, enters or embraces the contact clips In some cases, however, the blade is not hinged and is removable

knit (text) Not woven with warps and filling, but produced by a series of loops of yarns.

knock (aut) See detonation

knockout (el) A portion of the wall of a box or cabinet so fashioned that it may be removed readily by the blow of a hammer at the time of installation in order to provide a hole, usually circular in shape, for the entrance of wires or the attachment of conduit, cable, etc

knot (lumber) An irregular growth in the body of a tree which interrupts the smooth curve of the grain The fibers of the tree are turned from their normal course and grow around the knot at that point of a tree where a limb is being formed. If the knot is large, cross grains are formed which cause the lumber to break easily

knot (nav) 1 Nautical miles per hour 2. A nautical mile, 6080 feet as adopted by the British Admiralty, 6,080.27 feet as adopted by the United States Hydrographic Office. The latter distance is equal to 1/60th part of a degree on a great circle of a sphere whose surface is equal to that of the earth.

knot (rigging) A knot is generally taken to mean any tie or fastening with flexible cord or ropes, and includes bends, hitches, splices, etc. These distinctions are very loosely applied, the ame tie is sometimes called a sheet bend, weaver's knot, and weaver's hitch.

knuckle (ship) An abrupt change in direction of plating, frames, keel, deck, tank top, and other structures of a vessel Most frequently used with reference to the line at the apex of the angle dividing the upper and lower part of the stern of counter See also knuckle line.

knuckle line (ship) A line around the stern of a ship on the cant frames, which divides the upper and lower parts of the stern Also an abrupt turn in any plate, bulkhead, tank top, or deck. The line where a flanged bracket is pressed is also called a knuckle line

Kodachrome (phot) Trade name for a subtractive process of color photography

Koroseal (chem) Trade name for a group of plasticized vinyl resins which may be classed as synthetic rubbers This rubber is claimed to be tear resistant and better than natural rubber in flexibility at normal temperatures Its abrasion resistance is also said to be better than natural rubber at normal temperatures. Used for coating for oil and gas pipes tubing for piping chemicals, transparent beer tubing, acid and gas resistant fabrics, gas masks, wire and cable insulation, and flame-proofing

L

lace (text). Materials of open structure, made either by hand or on lace machines.

lacquer (paint) A varnish made by dissolving shellac in wood alcohol and adding a pigment.

ladder (ship) Inclined or vertical steps on board ship taking the place of "stairs."

ladle (foundry) A large pot of steel with refractory lining, used for pouring molten metal.

ladle barrow (foundry) A barrow used in foundries for carrying a ladle filled with molten metal.

lag screw (mach) A screw used for holding metal to wood. It cuts its own threads in undersized holes bored in the wood.

lake. Applied to colored printing inks, means that the pigment is made by absorbing animal, vegetable, or coal-tar coloring matter from an acqueous solution by means of a metallic base, an aniline dye precipitated on a transparent base. Lake colors are transparent colors, and are of many hues—crimson, green, olive, red, purple, yellow, etc.

lambert (L) A unit of *brightness* equal to $1/\pi$ candle per square centimeter, and therefore is equal to the uniform brightness of a perfectly diffusing surface emitting or reflecting light at the rate of one lumen per square centimeter

laminar flow (aer) A particular type of streamline flow The term is usually applied to the flow of a viscous liquid near solid boundaries, when the flow is not turbulent.

laminated. Built up in thin layers.

laminated brush (el) A contact part consisting of thin sheets of conducting material fastened together so as to secure individual contact by the edges of the separate sheets.

laminated safety glass A built-up glass with a sheet of tough plastic material bonded between two sheets of glass If this glass breaks, the plastic stretches, serving as a cushion and also holding the sharp glass fragments firmly This type of glass is extensively used in automobiles

lampblack. Formerly the most important black pigment used in the manufacture of printing inks. It is produced by the burning of oils and fats with an insufficient supply of air for complete combustion. The soot thus formed is allowed to settle in large chambers, and is collected from time to time. Gas black has now largely surpassed lampblack as a pigment in printing ink.

lampholder (el) A device intended to support an electric lamp mechanically and connect it electrically to circuit wires Also called "socket" and "lamp receptacle."

lamp house (phot) The dome-shaped housing of an enlarger, generally consisting of a reflector, ventilator unit, and lamp socket.

lamp receptacle (el) See lampholder

lamp regulator (el) A device for automatically maintaining constant voltage

on the lamp circuit, with a varying higher voltage on the generator to permit charging of batteries

lams (text) Horizontal bars between heddle frames and pedals, used to keep the heddle frames balanced

land (mach) Metal left between flutes or grooves in drills, taps, reamers and other tools or parts

land breeze (met) A shallow mild wind blowing from cold land into warmer water during hours of darkness It is limited to coasts

landfall (nav) Sighting land A good landfall is made when a vessel sights the land as intended

landing (aer) The act of terminating flight in which the aircraft is made to descend, lose flying speed, establish contact with the ground, and finally come to rest.

landing (ship) The distance from the edge of a plate or bar to the center of the first rivet hole.

landing angle (aer) The acute angle between the wing chord and the horizontal when the airplane is resting on level ground in its normal position, also called "ground angle."

landing area floodlight (aer) A device designed for location at a landing field to illuminate all or part of the surface of the landing area.

landing area floodlight system (aer) A complete installation of floodlighting equipment designed to illuminate a landing area

landing crew (aer) A detail of men necessary for the landing and handling of an airship on the ground Also called "ground crew"

landing-direction light (aer) A light designed to indicate, either by itself or in conjunction with other lights the direction in which landings are to be made.

landing field (aer) Any area of land designed for the take-off and landing of aircraft. It may or may not be part of an airport

landing gear (aer) The understructure which supports the weight of an aircraft when in contact with the land or water and which usually contains a mechanism for reducing the shock of landing Also called "undercarriage"

landing light (aer) A device designed for use aboard an aircraft to illuminate a ground area from the aircraft while landing.

landing stairs (ship) Tread on stairs enlarged to form a platform

landing strip (aer) A narrow and comparatively long area forming part of a land plane airport or of an intermediate or auxiliary field, which is suitable for the landing and take-off of airplanes under ordinary weather conditions

landing tee (aer) See wind tee.

landing wire (aer) A wire or cable which braces the wing against the forces opposite to the normal direction of the lift.

landmark beacon (aer) A beacon light, other than an airport beacon or an airway beacon, that serves to indicate a definite geographical location

landplane (aer) An airplane designed to rise from and alight on the land

lap (ship) A joint in which one part of a plate overlaps another, thus avoiding the use of a butt strap

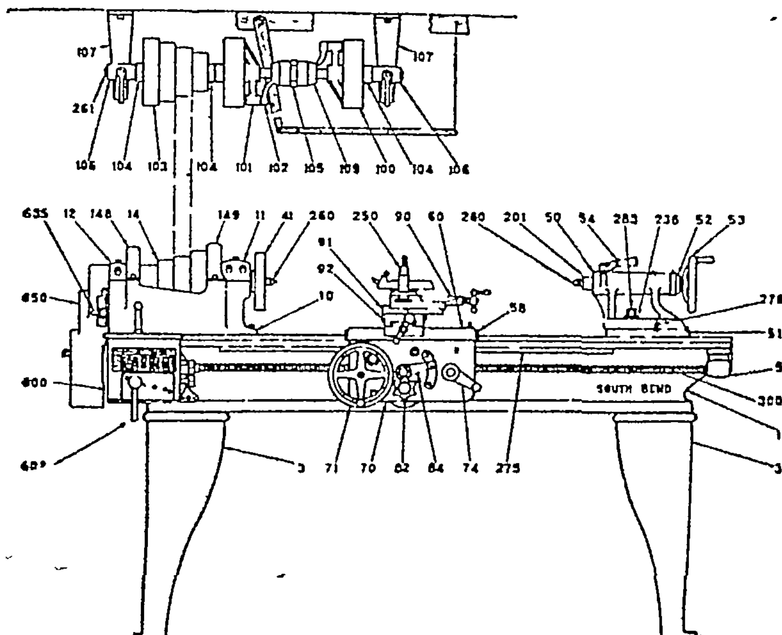
lap (text) A wide sheet of fibers before it is drawn out into slivers

lap joint (carp) A joint of two pieces lapping over each other

lap joint (weld) A welded joint in which two overlapping parts are connected by means of fillet plug, slot, spot, projection or seam welds

Laplace's equation (el) States that, at any point in an isotropic medium, which is devoid of electric charges, the divergence of the electric displacement is zero

lap seam welding A seam welding process with the parts to be welded overlapped



Principal Parts of a Modern Back Geared Screw Cutting Precision Lathe
(Courtesy, South Bend Lathe Works)

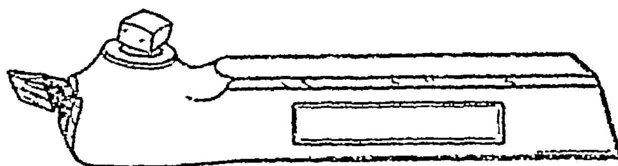
1 Bed
3. Long Legs
5 Lead Screw Bracket, Rear
10. Headstock
11 Headstock Cap, Large
12. Headstock Cap Small
14. Spindle Cone
41 Small Face Plate
50 Tailstock Top
51. Tailstock Base
52. Tailstock Nut
53. Tailstock Hand Wheel
54. Tailstock Binding Lever
58. Saddle Felt Retainer
60 Saddle
70. Apron
71 Apron Hand Wheel
74 Nut Cam
82 Apron Clutch Knob
84 Idler Gear Shifter Lever
90 Compound Rest Top
91 Compound Rest Swivel
92. Compound Rest Base
100. Clutch Pulleys
101 Clutch Spiders
102. Clutch Levers
104 Collars
105. Yoke Lever
106. Boxes
107 Hangers
109 Yoke Cone
148. Quill Gear Guard
149 Bull Gear Guard
201 Tailstock Spindle
236. Tailstock Nut Washer
250 Tool Post
260. Centers
261 Shaft
275 Rack
278. Tailstock Set Over Screws
283. Tailstock Clamp Nut
300 Lead Screw
600. Gear Box
602. Gear Box Tumbler
635 Reverse Bracket
650. Primary Gear Guard

lapse rate (met) The rate at which any atmospheric property lapses with altitude. More particularly, the rate at which temperature lapses

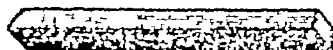
lashing (rigging) The tying together of objects such as spars or poles with rope, but it also refers to the cords or ropes with which such lashings are made Some examples are square and tripod lashings, and lashings for shears.

latch needle (text) A needle having a pivoted latch for entry and removal of yarn, used in ribbed knitting on flat or circular latch needle knitting machines

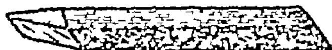
APPLICATION OF LATHE TOOLS



Lathe Tool Holder—Straight Shank



Cutter Bit—Not Ground



Cutter Bit—Ground to Form



A
Left Hand Turning-Tool



B
Round Nose Turning-Tool



C
Right Hand Turning-Tool



D
Left Hand Facing-Tool



E
Threading Tool



F
Right Hand Facing-Tool



G
Cut-Off Tool

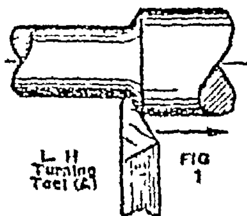


FIG 1 L. H. Turning Tool (A)

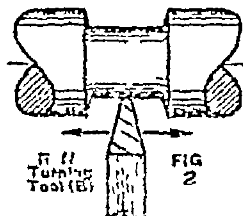


FIG 2 R. H. Turning Tool (B)

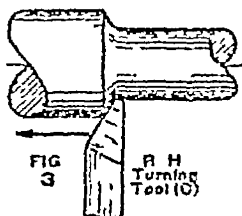


FIG 3 R. H. Turning Tool (C)

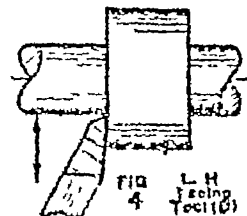


FIG 4 L. H. Facing Tool (D)

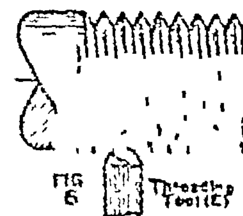


FIG 5 Threading Tool (E)

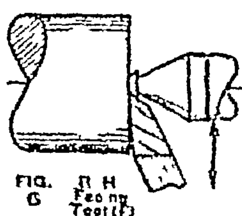


FIG. 6 R. H. Facing Tool (F)

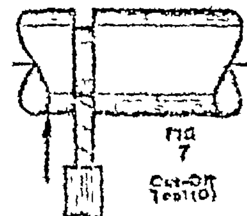


FIG 7 Cut-Off Tool (G)

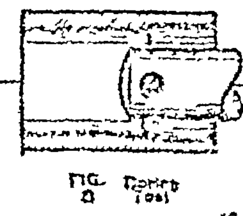
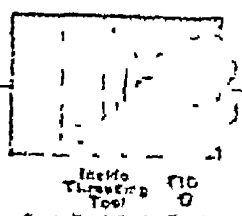


FIG. 8 Boring Tool



Inside Threading Tool FIG. 9

(Courtesy South Bend Lathe Works)

latent heat of fusion (met) The quantity of heat necessary to change 1 gram of a solid to a liquid with no change in temperature It is measured in calories per gram

latent heat of vaporization (met) The quantity of heat necessary to change 1 gram of a liquid to vapor with no change in temperature It is measured in calories per gram

latent image (phot) The image recorded upon a plate, film or paper by light action, invisible until chemically treated by the process known as development.

lateral axis (aer) See axes of an aircraft.

lateral resistance derivatives (aer) Resistance derivatives expressing the variation of moments and forces due to small changes in the lateral yawing and rolling velocities

lateral stability (aer) Stability with reference to disturbances about the longitudinal axis, i e, disturbances involving rolling or sideslipping The term lateral stability is sometimes used to include both directional and lateral stability, since these cannot be entirely separated in flight.

lathe. See illustration, page 168

lathe hand (mach) The name given to a lathe operator His duties include reading blueprints grinding cutting tools, setting up the work, etc

laths (carp) Narrow strips to support plastering

latitude (nav) The latitude of a point on the earth's surface is the number of degrees in the arc of a meridian from the equator to the point the angle which the plane of the horizon makes with the earth's axis, the elevation of the pole of the heavens the angle which a plumb line at the point makes with a plumb line on the same meridian at the equator

latitude (surv). The latitude of any place on the earth's surface is the angular distance of that place measured from zero degrees to ninety degrees north or south of the equator

latitude of exposure (phot) That quality in a film or plate which allows variations in exposure without detriment to negative quality

lattice (bldg) Crossed wood, iron plate, or bars

launch (ship) To place a vessel in the water after completion.

launching tubes (parachute flares) Tubes mounted on an aircraft through which a metal container carrying a parachute flare is launched, the tubes being so designed that as the container passes through the tube an electric current is completed which ignites a slow burning fuse in the parachute flare container, the fuse being so designed as to permit the parachute flare container to clear the aircraft before it ignites the parachute flare

lawn (text) A lightweight, fine count, carded or combed cotton fabric.

law of electromagnetic induction. The electromotive force induced in a circuit is proportional to the time rate of change of the flux of magnetic induction linked with the circuit When the change in flux linkages is caused by the motion, relative to a magnetic field, of a conductor forming part of an electric circuit, the electromotive force induced in the circuit is proportional to the rate at which the conductor cuts the flux of magnetic induction

law of electrostatic attraction. The force of attraction or repulsion between two charges of electricity concentrated at two points in an isotropic medium is proportional to the product of their magnitudes and is inversely proportional to the square of the distance between them The force between unlike charges is an attraction, between like charges a repulsion.

law of exponents (alg) Used in algebraic division and multiplication. In division, the law states that the exponent of any factor in a quotient is equal to its exponent in the dividend minus its exponent in the divisor In multiplication

to find the exponent of any number in a product, add the exponents of that number in the multiplicand and the multiplier

law of signs (alg) A conventional rule accepted by mathematicians for multiplying positive and negative numbers It is stated as follows, To multiply one signed number by another, determine the product of their absolute values and make the product positive if the multiplicand and multiplier have like signs, and negative if they have unlike signs

law of the lever (phy) If there is equilibrium for two weights or forces, the weights or forces are to each other inversely as their lever arms, or what is equivalent, the products of the weights by their lever arms are equal, or the sum of the moments of all the forces about the fulcrum is equal to zero

laws of electric networks. 1 The algebraic sum of the currents flowing toward any point in a network is zero 2 The algebraic sum of the products of the current and resistance in each of the conductors in any closed path in a network is equal to the algebraic sum of the electromotive forces in that path These laws apply to the "instantaneous" values of currents and electromotive forces, but may be extended to the "effective" values of sinusoidal currents and electromotive forces by replacing "algebraic sum" by "vector sum" and by replacing "resistance" by "impedance"

lay (el) The lay of any helical element of a cable is the axial length of a turn of the helix of that element. Among the helical elements of a cable may be each strand in a concentric-lay cable or each multiple conductor in a multiple-conductor cable

layer (weld) A stratum of weld metal consisting of one or more "passes"

laying off (ship) Marking plates, bars or shapes for shearing punching bending and identification from a template or print

lay out (e p) To develop on a working surface, lines to their true dimensions

layout man (mach) One who transfers blueprint designs and dimensions to metal stock with the aid of measuring and marking tools

L. B P (ship) Abbreviation for "length between perpendiculars" Measured from the forward perpendicular to the after perpendicular

L. C D (math) Abbreviation for least common denominator

L. C. M (math) Abbreviation for least common multiple.

lea (text) (1) A unit of yarn length (2) A 300 yard hank of linen yarn (3) A skein used for strength tests The skein contains 80 turns, each of 1.5 yards in length

leach See leach liquor

leaching (metal) The treatment of a solid material with a liquid capable of extracting the soluble portions

leach liquor A solution obtained by leaching

lead (mach) The distance a screw advances axially in one turn On a single-thread screw the lead and pitch are identical, on a double-thread screw the lead is twice the pitch, and etc.

lead (Pb) Usually found in combination with sulphur or oxygen. Bluish white in appearance in the pure state Soft and malleable Used in alloys soldering etc In combination with tin it is used in coating thin sheets of black iron which are then called "terne plates" At. wt 207.22, m p 325 to 335° C, sp. gr 11.3

lead-covered cable (el) A cable provided with a sheath of lead for the purpose of excluding moisture and affording mechanical protection Also called lead-sheathed cable.

lead float file A single-cut file for use on lead, babbitt, and other extra-soft metals

lead in (rad) A lead-in of an antenna is that element which completes the electric connection between the instruments or disconnecting switching and the antenna

leading edge (aer) The foremost edge of an airfoil or propeller blade

leads (print) Thin strips of soft metal used between lines of type to open them out more or less. They are made in different thicknesses, based on the point system. The most common thickness is the 2-point.

leakage circuit (el) A stray current of relatively small value which flows through or across the surface of solid or liquid insulation when a voltage is impressed across the insulation.

lean mixture (aut) A mixture in which the proportion of air to fuel is greater than the ideal.

lease (text) The part of the warp which keeps the threads in exact order while being put on the loom.

lease eye (text) The eye in the center of the heddle, through which the warp yarn is drawn.

least common denominator (math) The least common multiple of the denominators of two or more fractions Also called the lowest common denominator Abbr L. C. D

least common multiple (math) The lowest of the common multiples of two or more numbers Example 24 is the least common multiple of 2, 3, 8, and 12. Also called lowest common multiple Abbr L. C M

leather Leather is obtained principally from the hides and skins of domestic animals Prior to tanning of the hides, the hair, flesh, and useless parts are removed, followed by washing and trimming The tanning process is undertaken to stop decomposition, to give the hides greater strength, toughness, and pliability, and to make them impervious to water The processes are the tanbark treatment, treatment with different oils or tallow, and the chrome or chemical process Leather of various grades finds use in a variety of articles, the more important of which are listed below Cushions, pads on cockpit cowlings, chafing strips and pads, lacings, head-rest coverings, float bumpers, strainers (Chamois), gauntlets, moccasins and shoes, puttees, helmets, jackets, winter flying suits, straps and safety belts.

leather (nav) The portion of an oar which rests in the rowlock. This is sometimes covered with canvas, but is usually covered with leather

ledgerboard (bldg) The support for the second-floor joists of a balloon-frame house, or for similar uses, also called ribband.

leech (ship) The after edge of a fore-and aft sail.

lee shore (nav) A shore onto which the wind is blowing It is considered dangerous

lee side (nav) The side away from the wind.

leeward (nav) The direction toward which the wind is blowing, away from the wind.

leeway (nav) The lateral movement of a ship to leeward off her course, owing to the side thrust of the wind

left-hand engine (aer) An engine whose propeller shaft, to an observer facing the propeller from the engine end of the shaft, rotates in a counter-clockwise direction

legend (draw) The section of a blueprint having marginal data of various kinds. These include such items as the title or name of the object or structure represented, the scale, pertinent construction data, etc.

leg of a circuit (el) Any one of the conductors of an electric supply circuit between which is maintained the maximum supply voltage

leg of fillet weld (weld) The distance from the point where the original surfaces intersected, to the toe of the fillet.

Leisegang phenomena (chem) If one compound, such as potassium chromate is dissolved in a gelatin gel and a solution of another substance, such as silver ni

trate is allowed to diffuse into the gel, the precipitate which forms (silver chromate) forms a series of concentric rings, separated by more or less clear portions of the gel. These rings are called Liesegang rings. No completely satisfactory explanation has been offered.

Lenard tube (el). See cathode-ray tube.

lens (glass) Lenses are usually made of flint glass or of crown glass. Flint glass is produced by melting sand, lead, and soda together, while crown glass is made by melting sand, lime, and soda together

lens (phot). A circular glass or combination of glasses optically ground and polished, mounted in a metal cell.

lens (phy) A portion of a refracting medium consisting of any transparent substance bound by two spherical surfaces having a common axis.

lens speed (phot) The speed of a lens is determined by two factors: first, the diameter of the effective aperture, and second, the focal length of the lens

lens speed marking systems (phot) Diaphragm, or stop openings are marked in two systems, both based on the fundamental ratio of lens opening diameter to lens focal length. In the "f." value system the opening is expressed as a fraction of lens focal length; thus, "f. 8" means the aperture is ⅛ of focal length. In "U. S." or Uniform System the numbers are proportional to the exposure required, "f. 4" being taken as unity.

lenticular Having the shape of a lens.

Lenz's law (el). The current induced in a circuit as a result of its motion in a magnetic field is in such a direction as to exert a mechanical force opposing the motion.

letterpress printing. Printing from type, as distinguished from lithographic work and that done from copperplate, steel-plate, and other engravings

level (surv). A term describing the position of a line or plane when parallel to the surface of still water; an instrument or tool used in testing for horizontal and vertical surfaces, and in determining differences of elevation.

TYPES OF SIMPLE LENSES



Bi-Convex



Plano-Convex



Bi-Concave



Plano-Concave



Convexo-Concave or Meniscus



Concavo-Convex or Meniscus

level landing (stress analysis). A loading condition for the fuselage and landing gear representing a two-point landing, with the fuselage horizontal

level-off (aer). To make the flight path of an airplane horizontal after a climb, glide, or dive.

lever (phy) A rigid bar used to lift weights by placing the bar against a support called the fulcrum, and applying a force or weight. A lever is said to be of the first, second, or third type depending on whether the fulcrum is under the bar and between the weights, under the bar at one end, or above the bar at one end

lever (text) A part of a table loom used to raise the heddle frames to make the "shed" They are the opposite equivalent of the pedals of a floor loom which pull the frames down for the same purpose

lever arm (phy) The distance of a weight or line of action of a force from the fulcrum of the lever

levo rotatory (chem) The rotation of the plane of polarized light to the left, shown by solutions of many optically active compounds.

L-head (aut) This term is applied to a type of engine and refers to the arrangement of exhaust and inlet valves on one side of the cylinder only, the valves forming the horizontal line, and the cylinder the vertical line of an L The arrangement may also be that of an inverted L.

lie to (nav) To remain in practically the same position without anchoring This may be done in a sailing vessel by "dousing sail", "reducing sail", or "heaving to"

lift a template (ship) To construct a template to the same size and shape as the part of the ship to be duplicated.

lift direction (stress analysis) The direction in the plane of symmetry perpendicular to the relative wind (cf beam, chord, drag and side directions)

lift/drag ratio (aer) The ratio of the lift to the drag of any body

lift force (stress analysis) A force, or component, in the lift direction Also called lift component. (cf beam, chord, drag, and side forces)

lift from the hull (ship) As a rule, templates are made for most plates and bars, but sometimes it is necessary to "lift" by placing a frame of wood around the opening for the missing plate, and when nailed, to transfer the holes of the adjoining plates by pencil mark, and when a sufficient amount of landing has been given, the plate should be the proper size.

lift wire (aer) A wire or cable which braces the wings against the lift force Sometimes called "flying wire"

lifting (ship) Transferring marks, shapes, and measurements, from a ship drawing or model, to a plate or other object, by means of templates

ligature (print) Two letters tied together and cast on the same body, like fi, ff, etc

light (el) For the purposes of illuminating engineering, *light* is radiant energy evaluated according to its capacity to produce visual sensation The standard basis for the evaluation of radiant energy as light (or of radiant flux as luminous flux) when different spectral distributions are involved, is the set of relative luminosity (visibility) factors adopted by the Illuminating Engineering Society and the International Commission on Illumination in 1924 and by the International Committee on weights and measures in 1933

light (phy) The exact nature of light is unknown, but it is supposed to be caused by vibrations transmitted in waves through a medium called the ether These waves average about 1/50,000th of an inch in length and travel at the rate of about 186,000 miles a second.

lighted wind tee (aer) A lighted wind indicator having the form of a tee in a horizontal or slightly tilted plane

lightening holes (ship) A hole cut in a plate to make it lighter and yet not reduce its strength Sometimes large enough to be called a manhole

lighter (nav) A craft used in loading and unloading vessels

light filter (phot) A colored glass, or stained film, used on or between the lens to absorb rays of certain colors and allow others to pass through.

light fog (phot). A graying of the image, produced by an unsafe darkroom lamp, or accidental exposure to white light. See also fog

lighting outlet (el). An outlet intended for the direct connection of a lampholder, a lighting fixture or a pendant cord terminating in a lampholder

light load line (ship) The water line when the ship rides empty

light modulation (television) See positive, negative light modulation.

lightning (el) An electric discharge occurring in the atmosphere, one terminal of which is a cloud.

lightning (met) An atmospheric electrical discharge. It is normally associated with cumulonimbus clouds.

lightning arrester (el) A device which has the property of reducing the voltage of a surge applied to its terminals, is capable of interrupting follow current if present, and restores itself to its original operating conditions

lightning lines (phot) Forked or branched lines in a negative resembling lightning Caused by static electricity produced by friction as the film passes through the camera.

light port (ship) An opening in a ship's side provided with a glazed lid or cover for the admission of light.

light trap (phot) A device consisting of a bar under spring pressure which excludes any light that may enter a plate or film holder through the slide slot when the slide is withdrawn. In a darkroom it is a circuitous passage so constructed as to take advantage of the fact that light will not travel around a corner Thus the photographer can enter and leave the room without admitting any light.

light water line (ship) The line to which a vessel is submerged without cargo on board.

lignin (paper) In paper pulp-making, a name given to the impurities found mixed or combined with cellulose in wood in amounts approximately equal to the cellulose. All save a trace, which is however injurious, is removed in the preparatory cooking of the chemical wood pulp

lignite. Commonly known as brown coal. The softest form of coal, somewhat similar to peat.

limber holes (ship) Holes in the bottoms of floors for drainage, or at the top of floors for gas to escape.

lime (chem) The common name for limestone.

limits of tolerance (mach) Tolerance in machine tool work means an allowable variation from a dimension. For example, if a diameter is specified as 1 inch plus or minus 0 005 inch, it means that the diameter of the finished work may be 0 005 inch more or less than 1 inch Limits of tolerance are best expressed as decimals, occasionally however they are written as fractions

limp (book). Leather or cloth bindings for books which are flexible and bend easily, in distinction from boards or stiff covers

linear equation (alg) See simple equation.

line conductor (el) One of the wires or cables carrying electric current, supported by poles, towers or other structures, but not including vertical or lateral connecting wires

line cut (print) See line engraving.

line engraving (print) That style of engraving in which the effect is produced by lines or combinations of lines, in distinction from halftone or similar work in which the effects are obtained by masses of dots of larger or smaller dimensions. Copper and steel engraving made by direct incision of the graver or the dry-point, wood engravings, as well as zinc etchings made from pen drawings are classed as line engravings.

liquid crystals (chem) A melt or solution of a crystalline substance which shows orientation, as by double refraction, indicating a shaping or grouping of molecules along different axes which do not show the same optical, magnetic or electrical properties in all directions.

lisle (text) A fine, smooth, cotton yarn, 2-ply, for knitting purposes. Made from long staple cotton, tightly twisted and gassed.

list (ship) If one side of a vessel lies deeper in the water than the opposite side, caused by the shifting of cargo, etc., it is said to list.

liter Equals 0.2642 U. S. gallons. A measure of capacity in the metric system, being a cubic decimeter, equal to 61.022 cubic inches, or 0.890 imperial quart, or 0.908 U. S. dry quart, or 1.0567 U. S. liquid quarts. It is equal to one kilogram of water at maximum density. Sometimes spelled "litre."

literal number (alg) Any letter of the alphabet used to represent a number.

litharge. An oxide of lead. A yellowish to yellowish red powder which is crystalline. Used in the patching of acid tower linings. It may be used as a substitute for red lead in the manufacture of lamp lenses, optical lenses, camera lenses, cut glassware, and flint glass. Also used in the manufacture of acid resisting cements.

lithography (print) The process of printing from a flat stone. The design to be printed is drawn on a stone of peculiar quality with a specially prepared ink which clings to and dries on the surface. The surface is then subjected to the action of a weak acid that hardens the ink and slightly etches and lowers the unprotected parts. The process of printing first requires moistening the surface with water, which is absorbed by the blank parts and repelled by the hard greasy lines of the design. Printing ink is then rolled over the stone and is repelled by the wet parts, but adheres to the ink-drawn design. The stone thus prepared is ready to make an impression on the sheet.

live (el) See alive.

live axle (aut) Applied to either or both of the revolving axles or jack-shafts inside the rear-axle housing, which are driven by a bevel gear and pinion. A general name for any type of axle with a concentric driving shaft.

live center (mach) A center that revolves.

live matter (print) Type composition or pages that have not yet been printed or molded for electrotyping, after it has been so used and there is no further need of it, it is dead matter ready for distribution.

L. O. A. (ship) Abbreviation for "length over all." Measured from the most forward part of the fore end to the most after part of the after end of the hull.

load. 1. The load on a machine or apparatus is the power which it delivers. 2. The load on an alternating-current machine or apparatus is the product of the effective current through the machine or apparatus and the effective potential difference between its terminals. 3. The amount of turning effort required of a motor, measured usually in units of electric current or amperes.

load curve (el) A curve of power vs. time showing the value of a specific load for each unit of the period covered.

loaded water line (ship) The line to which a vessel is submerged with full cargo.

load factor (aer) The ratio of two loads (the second being a basic load) that have the same relative distribution. The first load may be the load applied during some special maneuver, the maximum probable load on the airplane or part, the design load or the ultimate load. Whenever a load factor is mentioned, the context should indicate clearly, what load is being compared with the basic load. If the context does not so indicate, the load factor is usually the ratio of the design load to the weight of the airplane.

load factor (el) The ratio of the average load over a designated period of time to the peak load occurring in that period.

loading (paper) A term applied to the various substances employed for the purpose, as is commonly supposed, of making heavy paper Substances like China clay, kaolin, etc., are not added simply to give weight, but they serve to produce a smoother surface and to increase the opacity of the paper Sometimes called "filler"

loading (tp) The alteration of the linear reactance of a line for the purpose of improving its transmission characteristics throughout a given frequency band.

loading coil (rad) In radio usage, an inductor inserted in a circuit to increase its inductance but not to provide coupling with any other circuit. In wire communication, an inductance coil for use in coil loading

load regulator (el) A regulator which functions to maintain load as designated at a predetermined value or to vary it according to a predetermined plan.

loadstone. See *magnetite*.

local action (el) Local action in a battery is the loss of otherwise usable chemical energy by currents which flow within the cell or battery regardless of its connections to an external circuit.

local battery telephone set. A telephone set for which the transmitter current is supplied from a battery, or other current supply circuit, individual to the telephone set. The signaling current may be supplied from a local hand generator or from a centralized power source.

local central office (tp) A central office arranged for terminating subscriber lines and provided with trunks for establishing connections to and from other central offices.

local control (phot) See *dodging*

locked rotor torque (el). The locked rotor torque of a motor is the minimum torque which it will develop at rest for all angular positions of the rotor, with rated voltage applied at rated frequency Also called static torque.

locker (ship) A storage compartment in a ship

locking up (print) Tightening a form by means of quoins or screws, to prepare it for working on the press

lock joint (metal) A sheet metal joint made by folding the edges over and interlocking them.

lock washer (mach) See *washer*.

locus (geom) (plural loci) The locus of a point is its path moving in accordance with a given geometric law

loft (ship). See *mold loft*.

loft floor (aer-ship) A large flat table or wooden surface in the lofting room. Layouts for airplanes, ships, and other streamline structures are made on the loft floor

lofting (aer-ship) The procedure which is used in plotting and laying out by means of templates and patterns the structural members and surfaces of aircraft, ships, speedboats, and other streamline structures. This is done in a shop called the "mold loft" on a large wooden surface or table called the "loft floor" The purpose of this procedure is to insure perfect fairing of curved and odd surfaces

lofting room (aer-ship) See *mold loft*.

loftsman (ship) A man who lays out the ship's lines in the mold loft and makes the molds and templates

lŏg (air nav) A written record of computed or observed navigational record.

logarithm (math) The logarithm of a number is the power to which it is necessary to raise a given number, called the "base," to produce the number. The base of a given system of logarithms is the same for all numbers, 2 is the logarithm of 100 to the base 10, written $\log_{10}100=2$, and -2 is the logarithm of 01 to base 10 Logarithms are used to expedite multiplication, division, evolution and involution.

logotype (print) Several letters, a syllable, or a whole word cast on one body

Lohmannizing (metal) A coating process for the protection of metal against corrosion. In this process the metal is first immersed in a bath containing an amalgamating salt, then pickled, and dipped in two or more different baths of molten alloys. The metals used in the baths are usually alloys of zinc, tin, and lead. Terneplate is an example of this process.

long bridge (ship) See catwalk bridge.

longeron (aer) A principal longitudinal member of the framing of an airplane fuselage or nacelle, usually continuous across a number of points of support.

longitude (air nav) The angular distance at the axis of the earth between the plane of a meridian and the plane of the prime meridian of Greenwich, England, measured to the eastward or westward to 180°.

longitudinal (aer) See intermediate longitudinal, main longitudinal.

longitudinal (ship) A bulkhead, frame, or longitudinal stiffener, running fore and aft.

longitudinal axis (aer). See axes of an aircraft.

longitudinal bulkhead (ship). A partition wall of plating running in a fore and aft direction.

longitudinal feed (mach) Also called "long feed." Horizontal feed in the direction of the length of the machine.

longitudinal resistance derivatives (aer) Resistance derivatives expressing the variation of moments and forces due to small changes in the longitudinal, normal, and pitching velocities.

longitudinal stability (aer) Stability with reference to disturbances in the plane of symmetry, i.e., disturbances involving pitching and variation of the longitudinal and normal velocities.

longleaf pine (Pinus palustris) Valuable for flooring and heavy timbers. The wood is close-grained, hard and tough. It is the chief source of resin and turpentine [illegible] Maximum crushing strength 10,830 lbs. per sq in. Shearing strength parallel to grain 1,640 lbs. per sq in.

long nose pliers (el) See pliers.

long ton. Refers to the British long ton or gross ton of 2,240 pounds.

lookout (bldg) The end of a rafter, or the construction which projects beyond the sides of a house to support the eaves, also the projecting timbers at the gables which support the verge boards.

loom (nav) The rounded portion of an oar between the blade and handle.

loom (text). A weaving machine

loop (aer) A maneuver executed in such a manner that the airplane follows a closed curve approximately in a vertical plane

loop antenna (rad) An antenna consisting essentially of one or more complete turns of wire. Sometimes called a "coil antenna."

looping-in (in interior wiring). Looping-in is a method of avoiding tee joints by carrying the conductor to and from the point to be supplied.

loop-knot (text) A snarl, or curl, produced by a filling yarn coiling upon itself.

loops (raw silk). (text) Small, open places in the yarn, due to the excessive length of one or more cocoon filaments

loop test (el). Loop test is a method of testing employed to locate a fault in the insulation of a conductor when the conductor can be arranged to form part of a closed circuit or loop.

loose sail (nav) A command to unfurl sail and prepare for use.

loss factor (el). The ratio of the average power loss to the peak load power loss, during a specified period of time.

loudspeaker (rad). A telephone receiver designed to effectively radiate acoustic power for reception at a distance.

louver (aut) Opening or vent in the hood, fender panel, or cowl, intended to ventilate the compartment.

louver (bldg) A kind of window, generally in the peaks of gables and the tops of towers, provided with horizontal slots which exclude rain and snow and allow ventilation.

lower booms (nav) Swinging spars along the ship's side to which ship's boats secure. Usually placed a little forward of amidships

lower case (print) That is, the lower case of the usual pair as they are on the compositor's frame. Being the nearest to his hand, it contains the letters and characters most frequently used, namely, the small letters of the alphabet, hence, these letters are termed lowercase letters even when placed elsewhere, to distinguish them from the capitals and small capitals.

lower dead center (aut) See bottom dead center

lower deck (ship) See orlop deck.

low key (phot) A print is said to be in "low key" when the few tones in it are mostly at the dark end of the scale.

low-pass filter (rad) A wave filter having a single transmission band extending from zero frequency up to some critical or cut-off frequency, not infinite.

low-voltage system (el) An electric system having an operating voltage less than 750 volts

low-wing monoplane (aer) A monoplane in which the wing is located at, or near, the bottom of the fuselage.

lubber line (air nav) A prominent fixed line on the aircraft compass, drift sight, directional gyro, pelorus, and radio direction finder loop, oriented parallel with the aircraft's longitudinal axis to furnish a reference point to indicate a heading or bearing

lubricated disk clutch (aut) See disk clutch.

Lucite. Trade name for a synthetic methyl methacrylate resin which is available in the form of sheets, rods, tubes, molded sheets, and compression and injection molding powders. It is a thermoplastic material, crystal clear unless pigmented. Used for airplane windshields, store fronts, display fixtures, light panels, medical and dental appliances, industrial parts, reflectors, automobile parts, edge-lighted radio parts, signs, brush backs, and lenses

luff (nav) The forward edge of a fore-and-aft sail.

luff (nav) To turn the boat's head into the wind as if to go about causing the luff of the sail to shake. This should be done when a gust of wind heels the boat over and threatens to capsize her When the tiller is put down and the boat heads up, the sails spill their wind, the heeling effect from them is lessened, and the danger of capsizing is temporarily averted. The sails should not be spilled completely but just enough so that the luff begins to shake

lug (mech) A knob or projection on an object, used either for lifting the object or to act as a stop to motion.

lug rig (ship) Applied to large quadrilateral sails bent to yards that hang obliquely to the mast, the halliards being secured nearer to one end of the yard than to the other In the "standing lug" rig used in the Navy, the foretack is lashed or hooked to an eyebolt on the after side of the foremast,

lumber (carp) Sawed parts of a log such as boards, planks, scantling, and timber

lumen (lm) The unit of luminous flux. It is equal to the flux through a unit solid angle (steradian) from a uniform point source of one candle, or to the flux on a unit surface all points of which are at unit distance from a uniform point source of one candle. For some purposes the kilolumen, equal to 1,000 lumens, is a convenient unit.

lumen-hour (lm hr) The unit of quantity of light. It is the quantity of light delivered in one hour by a flux of one lumen.

luminaire (el) A complete lighting unit consisting of a light source, together with its direct appurtenances such as globe, reflector, refractor, housing and such support as is integral with the housing.

luminous flux (*F*) The time rate of flow of light.

luminous intensity (phy) Luminous intensity, of a source of light, in a given direction, is the solid-angular flux density in the direction in question. Hence, it is the luminous flux on a small surface normal to that direction, divided by the solid angle (in steradians) which the surface subtends at the source of light. Mathematically a solid angle must have a point as its apex; the definition of luminous intensity therefore applies strictly only to a point source. In practice, however, light emanating from a source whose dimensions are negligible in comparison with the distance from which it is observed may be considered as coming from a point.

lute. Any plastic substance used for adhesive purposes or for sealing.

lux (lx), The practical unit of illumination in the metric system, equivalent to the "meter-candle". It is the illumination on a surface one square meter in area on which there is a uniformly distributed flux of one lumen, or the illumination produced at a surface all points of which are at a distance of one meter from a uniform point source of one candle.

L. W. L. (ship) Abbreviation for "load water line". A line painted on the side of the vessel to which the vessel sinks when carrying its full load. The water line when a vessel is carrying its full load.

M

machine tool (mach) Any machine of that class which, taken as a group, can reproduce itself.

machinist's file (mach) A term applied to various shapes of files, mostly double-cut, used in machine and repair shops.

machinist's vise (tool) A vise most commonly used in the machine shop and in automotive work. It has flat jaws and usually a swivel base, and is suitable for most ordinary metal work.

mackinaw (text) Heavy wool coating, usually of durable cloth, yarn dyed and woven in plaids. May have cotton warp or cotton mixed in yarns Used for coats for men, women, and children.

madder (bot) A plant found in India and parts of Asia, a dye or pigment obtained from it. Madder is used in forming pigments as lakes, etc., which receive their names from their colors; as madder brown, madder carmine, madder orange, madder purple, and madder yellow

magazine (phot) A holder constructed so as to take two or more plates.

magazine (print) That part of a composing machine in which the letters or the matrices are stored, ready to be assembled into lines.

magnesium (Mg) A silvery white metal that combines easily with oxygen. Used in the thermit welding process, and in the refining of copper ores. At. wt. 24.32, m.p 651° C, sp gr 1 7

magnet (el) A body which produces a magnetic field external to itself.

magnet-armature loudspeaker (rad) A loudspeaker the operation of which involves vibration in a ferromagnetic circuit This is sometimes called an electromagnetic or magnetic speaker

magnet brake (el) A friction brake controlled by electromagnetic means

magnetic azimuth (surv) The magnetic azimuth of a given line is the angle measured clockwise from magnetic north to the line

magnetic bearing (air nav) True bearing with variation applied.

magnetic braking (RR) A system of electric braking in which brakes are applied by magnetic force, the current for exciting the electromagnets being derived either from the traction motors, acting as generators or from an independent source

magnetic circuit (el) A closed path of magnetic flux, the path having the direction of the magnetic induction at every point.

magnetic course (M C.) (air nav) The course true, with variation applied.

magnetic field (el). A vector field of magnetizing force. At every point the divergence of the magnetic intensity of a current is zero, so that the magnetic [illegible] field As [illegible] l indicates [illegible] the magnatizing force values are of significant magnitude with respect to the conditions under consideration.

magnetic heading (air nav) Heading with variation applied.

magnetic induction (B) (el) Magnetic induction at any point in a magnetic field is a vector quantity which determines the electromotive force induced in an elementary conductor that is moving through the field at that point. The value of the electromotive force is proportional to the component of the magnetic induction which is perpendicular to the plane in which the conductor moves, as well as to the product of the length of the conductor, its velocity, and the sine of the angle between the direction of the conductor and the direction of motion. In a vacuum, magnetic induction at a point has the same direction as, and is proportional in magnitude to, the magnetizing force at the point. In material media, magnetic induction is a function of the configurations of the electrons and atoms of the material.

magnetic intensity (produced by an electric current) The magnetic intensity at any point in the neighborhood of a circuit in which an electric current is flowing can be computed on the assumption that every infinitesimal length of circuit produces at the point an infinitesimal magnetic intensity, and the resulting magnetic intensity at the point is the vector sum of the contributions of all the elements of the circuit.

magnetic loudspeaker (rad) A loudspeaker in which the mechanical forces result from magnetic reactions.

magnetic microphone (rad) A microphone the electric output of which is generated by the relative motion of a magnetic field and a coil or conductor located within the magnetic field.

magnetic pickup (el) A phonograph pickup the electric output of which is generated by the relative motion of a magnetic field and a coil or conductor located within the magnetic field.

magnetic pole (el) The magnetic poles of a magnet are those portions of a magnet toward which the external magnetic [illegible] tend to converge or diverge. The size and position of the poles of a magnet depend upon its shape and characteristics. For a long, thin magnet, the poles occupy small regions near the ends, so that for many purposes the poles of such a magnet may be considered as concentrated at points.

magnetic rotation (of polarized light) When a plane polarized beam of light passes through certain transparent substances along the lines of a strong magnetic field, the plane of polarization of the emergent light is different from that of the incident light. On looking from north to south along a line of magnetic intensity, the rotation is clockwise. Also called Faraday effect.

magnetics (el) That branch of science which deals with the laws of magnetic phenomena.

magnetic speaker (rad) See magnet armature loudspeaker.

magnetic transition temperature (el) The magnetic transition of a ferromagnetic material is the temperature at which, with increasing temperature, the transition from ferromagnetic to paramagnetic properties appears to be complete. The change in magnetic properties with temperature extends over an appreciable temperature interval, so that the value obtained for the 'magnetic transition' temperature depends upon experimental conditions. Also called Curie point.

magnetite (metal) An oxide iron ore containing over 70% iron. It is black in color and exerts a strong magnetic attraction. Its chemical composition is Fe_3O_4. Also known as magnetic oxide and lodestone.

magneto booster (aer) An auxiliary magneto used for starting.

magnetometer (el) An instrument for measuring the magnitude and sometimes also the direction of a magnetic force.

magnetomotive force (F) (el). The magnetomotive force acting in any closed path in a magnetic field is the line integral of the magnetizing force around the path. In any closed path, the magnetomotive force resulting from a cur

rent is directly proportional to the current which links the path. The magnetomotive force F around any path is given in gilberts by the equation

$$F=\frac{4\pi NI}{10}$$

where N is the number of times the electric circuit links the path, and I is the current in amperes

magnet telephone set. A local battery telephone set provided with a hand generator, or magneto, for supplying signaling current.

main beam-longitudinal (ship) The two largest beams which support a deck and between which are cargo hatches

main beam-transverse (ship) Large beams at hatch ends, having the same size as longitudinal main beams.

main bearings (aut) The crankshaft bearings in the crank case

main body (ship) The hull proper, without deck house, etc.

main body frames (ship) Frames below the main deck of a vessel

main boom (ship) The boom on the main mast which spreads the foot of the mainsail.

main breadth line (ship) The greatest width of a ship If a ship's sides tumble home, the main breadth line will be at the point where the tumble home begins

main clamp (ship). A metal fitting for securing a mast at a thwart.

main deck (ship) The deck at the top of the main body frames. Above the main deck the frames are smaller and lighter in weight.

main deck stringer inner angle bar (ship) An angle bar forming the inner side of the waterway.

main deck stringer outer angle bar (ship) An angle bar connecting the main deck stringer to the shell plating

main frames (ship). See main body frames

main longitudinal (aer) A main longitudinal strength member of a rigid airship, which connects the various transverse frames

main mooring cable (aer) The wire cable by which an airship is hauled into a mooring mast.

main mooring line (aer) The line dropped from the bow of an airship to be coupled to the main mooring-mast line.

main mooring-mast line (aer) A line leading from the main winch of a mooring mast through the mooring attachment at the top of the mast for the purpose of attaching the main mooring line of an airship

mains (in interior wiring) The conductors extending from the service switch, generator bus or converter bus to the main distribution center

main shear wire (aer) A diagonal wire taking up main shear loads in the structure of a rigid airship

main transverse (aer) One of the main transverse strengthening frames of a rigid airship provided with wire or girder bracing and spaced at regular intervals throughout the length of the airship

major diameter (mach) The largest diameter of a screw thread

make-ready (print). See making ready.

making ready (print) Preparing a form on the press for printing by giving each part the proper impression, setting the gages, etc. The make-ready is the tympan sheet and overlays for a particular form. Making ready comprises all the operations needed to make a satisfactory impression on a form

making up (print) Arranging lines of type into uniform pages, with headings, page numbers, footnotes, etc., including the needed blank spaces Making up usually includes all the operations needed after type has been composed and corrected on the galley until it is ready to place on the imposing stone and lockup in the chase. In the case of

newspaper and other large pages, making up is done in the case on the imposing stone.

male die (book) A die, employed for embossing on a press, in which the design or letters are raised above the surface, the raised part corresponding or fitting into the depressed part of the female or counter die. The two dies are used in conjunction. Type is sometimes used for male dies

malleability (StM) The property of a metal which permits it to be hammered, pressed or rolled without fracture.

malleable iron. A term often used for wrought iron or malleable cast iron, an iron which can be forged or rolled without breaking

malleable materials (StM) Those which can be hammered into thin sheets without rupture

mallet (carp) A wooden headed, short-handled tool used to drive chisels, gouges, wooden pins, or small stakes. It is reinforced with iron bands at each end. The head is cylindrical and has two driving faces The mallet is swung as a claw hammer is swung It should not be used to drive nails, screws, or any objects in which metal may come in contact with the face of the mallet.

mandrel (mach) An axle or spindle, usually tapered, cylindrical, or expanding, inserted into a piece of work having a hole in it, to support the work while it is being machined

maneuver (aer) 1 To operate an aircraft in a careful manner so as to cause it to perform evolutions out of the ordinary 2. To perform tactical or acrobatic evolutions with aircraft.

maneuverability (aer) That quality in an aircraft which determines the rate at which its attitude and direction of flight can be changed

maneuvering valve (aer) A manually operated valve fitted in the envelope, ballonet or gas cell of an airship for the purpose of releasing gas or air from within the envelope or gas cell as desired.

maneuvering-valve hood (aer) A hood, or cowl, located on the outer cover of a rigid airship just over a maneuvering valve. It is usually made of light wood or fabric and is faced to facilitate the escape of gas

manganese (Mn) A hard, brittle metal usually found combined with iron and oxygen In the pure state, it is grayish white in color with a slight tinge of red. As an alloy with iron or silicon it is known as ferro manganese (spiegel) or silicospiegel. Its most valuable use is as a deoxidizing agent in the manufacture of steel, and as a component of manganese steel. At. wt. 54.93, at. no. 25, m p 1230° C, sp gr 7.42.

manganese bronze (metal) Manganese bronze is really a complex brass containing very small percentages of tin, iron, and manganese Owing to its high strength, the facility with which it may be forged or rolled, and its resistance to corrosion, manganese bronze is used in catapults, landing gears, tail skid fittings, caps, and brackets.

manganese steel (metal) An extremely hard and tough steel alloy (when tempered), having high tensile strength and wear resistant properties. Used for rails, railway track switches, safes, armor, etc The manganese content varies from 11 to 14 per cent. Sometimes called Hadfield manganese steel after its inventor

manhole. A subsurface chamber, large enough for a man to enter, in the route of one or more conduit runs, and affording facilities for placing and maintaining in the runs conductors, cables, and any associated apparatus.

manhole (ship) A hole in a tank, boiler or compartment on a ship, designed to allow the passage of a man for examination, cleaning and repair.

manhole chimney (el) A vertical passageway for workmen and equipment between the roof of the manhole and the street level.

manhole cover frame (el) The structure which caps the manhole chimney at ground level and supports the cover

manifold (aut) An assembly of pipes shaped or cast as a single unit. Auto engines have both an inlet manifold and an exhaust manifold.

manifold (weld) A multiple header for connection of individual gas cylinders or torch supply lines

manifold pressure (aer-aut) The pressure in the intake manifold of the engine. The weight of the mixture entering the engine cylinders is measured by manifold pressure and temperature.

Manila hemp (bot) A plant found in the Philippine Islands The fiber is strong and very suitable for ropes, which, when old, yield excellent paper pulp Also called abaca.

Manila paper A strong paper, usually of yellowish or light brown color, made from jute, gunny, old rope, etc., so called because originally made from Manila hemp Cheap grades are made from strong wood pulps.

manometer pressure (aerostat) The excess pressure inside the envelope of an aerostat over the atmospheric pressure at a standard reference point. The point of reference for the excess pressure is usually the bottom of the envelope or gas cell on airships and the level of the basket on kite balloons.

mantissa (math) The decimal part of a logarithm in the system which uses the base 10

manual control (el) An arrangement of controls which provides for opening or closing the switching devices by hand.

manual telephone system. A telephone system in which telephone connections between customers are ordinarily established manually by telephone operators in accordance with orders given verbally by the calling parties

manual welding. Welding wherein the arc is controlled or the torch is manipulated by hand

marbling (book) A process of decoratin leather, sheets of paper, and the edge of books with variegated colors in h regular patterns.

marcasite (min) A low-content iron min eral similar to iron pyrites. Sometime called white iron pyrites.

margin of safety (stress analysis) Th difference between the ultimate load an any applied load.

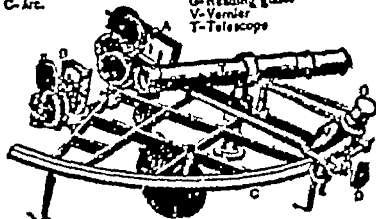
margin plate (ship) A tank top plat carrying a knuckle.

marine borer (lumber) Timber placed i water is subject to attack by two classe of marine borers, the mollusk and th crustacean type. The destructive mol lusk is a worm which by means of it head equipped with a shell-like substanc shaped like an auger, bores its way int timber, usually parallel to the grain an may ruin it in less than a year Th wood louse of the crustacean famil bores into wood by means of sharp jaws and can destroy piling within a year' time in heavily infested areas.

mariner's measure.
6 feet = 1 fathom.
120 fathoms = 1 cable length.
7½ cable lengths = 1 mile.
5,280 feet = 1 statute mile.
6,085 feet = 1 nautical mile.

marine sextant (nav) An instrument used to measure the vertical angle of celestial bodies from the natural horizon, or to measure the horizontal angles between terrestrial objects

SEXTANT



Mariotte's law (phy) See Boyle's law.

marker light (aer). A general term which includes boundary lights, contact lights, obstruction lights, range lights and circle lights.

marking gage (carp) A wooden instrument used to draw guiding lines parallel to an edge. It consists of a graduated wooden strip (the beam) upon which slides a block of wood (the head) The beam is fitted with a small metal marking point (the spur).

marsh gas. Methane, same as fire-damp More accurately used in recent years to describe the natural gas exuding from marshes, and also obtained from drilling near the surface, as distinguished from "deep gas," "oil gas," "petroleum gas," obtained from deep wells and indicative of the presence of oil By analysis, marsh gas is distinguished from oil gas by containing significant amounts of carbon dioxide (two per cent or more) and other impurities Large proportions of both carbon dioxide and nitrogen being present in natural gas from shallow wells, it may safely be assumed to come from the decomposition of surface organic matter

mash seam welding A seam welding process wherein the overlap is maintained sufficiently small to permit fusion and plastic reduction of the overlap to approximately the thickness of one of the parts being joined.

masking (phot) Covering the borders of a negative or print with an opaque mask so as to produce a white border on the print.

mass (phy) The mass of a body is that property which determines the acceleration the body will have when acted upon by a given force Newton's second law states that the force required to produce a change in the velocity of a body is proportional to the mass of the body and the rate of change in velocity This may be stated in the form of an equation as $F = Ma$, where F is force, in pounds, M is mass, in "slugs" (a unit of mass), and a is acceleration in feet per second per second

mast (aer) See radio mast, mooring mast.

mast (ship) A hollow steel pipe or tube made up of plates and doublers tapering smaller at the top, placed on the center line of the ship.

master oscillator (rad) An oscillator of comparatively low power so arranged as to establish the carrier frequency of the output of an amplifier

master switch (el) A switch which dominates the operation of contractors, relays or other magnetically operated devices.

mast step (ship) A small metal receptacle on the keel in which the heel of the mast rests.

mast yaw line (aer) One of the two lines leading from the winches at the base of the mooring mast through snatch blocks and carried to the leeward of the mast 60° from the wind direction. The airship's yaw lines are coupled to these lines The snatch blocks are fixed to anchorages selected so that the paired lines tend to keep the bow of the airship into the wind and prevent its overriding the mast. These lines are sometimes called "mast yaw guys" or "mast bow steadying lines." (The main mooring wire and the yaw guys, when taut, establish a fixed point in space.)

mat. (print). Abbreviation of matrix.

mat surface glass. Glass whose surface has been altered by etching, sand blasting, grinding, etc., to increase the diffusion. Either one or both surfaces may be so treated.

matching (carp) The method used in cutting the edges of a board to make a tongue on one edge and a groove on the other Also called "tongueing and grooving"

mathematical signs.

$+$ plus	□ square
$-$ minus	△ triangle
$=$ equality	▭ rectangle
$\times$ multiplied by	○ circle
$\div$ divided by	$\angle$ angle
$::$ geometrical proportion	∟ right angle
$\equiv$ identical with	⊏ or $>$ greater than
$\pm$ plus or minus	⊐ or $<$ less than
$\perp$ perpendicular	∞ infinity
$\sim$ difference	$\propto$ varies as
$\int$ integration	$\surd$ radical
⇔ equivalent proportion	$^\circ$ degree
$\backsim$ difference, excess	$'$ minute
therefore	$''$ second
because	

matrix (metal) 1 A die or mold used to give a specified shape to a metal. 2. A principal substance pulverized or crystallized in which a constituent is embedded.

matrix (print) The shallow mold in which the face of a type is cast, also the papier maché mold made from a page of type for stereotyping, the brass dies used on a type-casting machine.

matte (phot) A term applied to the rough type of surface on print papers The opposite of glossy

matter (phy) Any physical entity which possesses mass.

maul (tool) A large wooden hammer used for driving stakes or piles. In the rolling mill it is used for flattening hot iron plates or sheets

mauveine (chem) A purple aniline dye, the first of the coal-tar dyes to be discovered. It was first produced by W H. Perkin, an Englishman, in about 1856

maximum demand (el) The maximum demand of an installation or system is the greatest of all the demands which have occurred during a given period of time. The maximum demand is determined by measurement, according to specification, over a definitely prescribed time interval.

maximum range (aer) The maximum distance a given aircraft can cover under given conditions, by flying at the economical speed and altitude at all stages of the flight.

maxwell (el) The CGS electromagnetic unit of magnetic flux. The cgs unit of magnetic flux is obtained from the law connecting magnetic flux and magnetic induction.

mean aerodynamic chord (aer) The chord of an imaginary airfoil which would have force vectors throughout the flight range identical with those of the actual wing or wings.

mean blade-width ratio (aer) The ratio of the mean blade width to the diameter of the propeller

mean chord (of a wing) (aer) The quotient obtained by dividing the wing area by the span.

mean line (of an airfoil profile) (aer) An intermediate line between the upper and lower contours of the profile.

means (alg) The second and third terms of a proportion.

mean solar time. The average time required for the sun to pass over the meridian of a place twice, the time that would be shown by a sun dial if the sun were always on the celestial equator (in the plane of the earth's equator) and moving at a uniform rate Sometimes called "astronomical time."

mean temperature (air nav) The mean between the ground and air temperatures, used in correcting altimeter readings.

measure of brickwork. Brickwork is measured by the thousand, and for various thicknesses of wall runs as follows:

8¼-inch wall or 1 brick in thickness, 14 bricks per superficial foot.

12¾-inch wall, or 1½ bricks in thickness, 21 bricks per superficial foot.

17-inch wall, or 2 bricks in thickness, 28 bricks per superficial foot.

21½-inch wall or 2½ bricks in thickness, 35 bricks per superficial foot.

An ordinary brick measures about 8¼ × 4 × 2 inches, which is equal to 66 cubic inches, or 26.2 bricks per cubic foot. The average weight is 4½ pounds.

measuring telescope (surv) Consists of three essential parts 1. a convex objective which collects the rays of light and forms a bright inverted image of the object. 2. a convex eye piece which is essentially a microscope, for viewing the image formed by the objective 3 fine wires or spider webs placed in the plane of the image, the intersection of which indicates the precise point sighted. The objective collects the light, the eyepiece magnifies, and the cross hairs indicate the point at which the telescope is directed.

mechanical brakes (aut) Mechanical brakes employ cables or rods to distribute the braking effort to the wheels. Pressure applied by the operator at the brake pedal is multiplied by the ratio of the lengths of the various brake arms before it is transmitted to the operating shafts. Most mechanical systems equalize the braking action on each wheel by a device known as an equalizing cross shaft or arm

mechanical efficiency (aut) The ratio between the brake horsepower (b. hp) and the indicated or total horsepower (i. hp)

mechanical equivalent of heat (phy) Heat units converted into mechanical units. E.g., one B t u. equals 778 foot-pounds.

mechanical pilot (aer). See automatic pilot

mechanical trip (RR). A roadway device, which when in operative position, engages apparatus on the locomotive to effect an application of the brakes by the train control system.

mechanics. The mathematical theory of the motion and tendencies to motion of particles and systems under the influence of forces and constraints, the study of motions of masses and of the effect of forces in causing or modifying these motions. Usually divided into "kinematics" and "dynamics."

mechanic's rule (math) A rule for extracting square roots. The rule is as follows Make an estimate of the root, divide the number by this estimate, and take for the approximate square root the arithmetic mean (average) of the estimate and the quotient thus obtained. If a more accurate result is desired, repeat the process.

meeting rail (carp) The bottom rail of the upper sash, and the top rail of the lower sash of a double-hung window Sometimes called the "check rail"

melter (foundry) The man in charge of a metal melting furnace.

melting point (m.p.) The point at which a solid changes into a liquid state. The table of chemical elements indicates the melting points of the various elements. Sometimes called "fusion point."

melting rate (weld) The weight or length of electrode consumed in a unit of time.

melton (text). A thick, smooth, woolen fabric, usually heavier than broadcloth or jersey May contain cotton warp and woolen filling. Felted napped, shorn close, and given a dull finish.

Mendelejeff's law (chem phy) The "periodic law" based on successive atomic weights as related to the properties of the elements, discovered by the Russian chemist Mendelejeff in 1869. The "periodic law" states that the chemical properties of the elements are periodic functions of their atomic weights. This law has been superseded by the "new periodic law" which is based on "atomic number" (Moseley number) rather than atomic weight. See also "atomic number".

meniscus lens (photo). Comes from the Greek word meaning moon. It is so named because it is crescent-shaped like a quarter moon. It consists of a single piece of glass and is used only on the cheapest cameras.

Mercator course (nav navi). Also called rhumb line. A line on the earth's surface which intercepts all meridians at the same angle.

Mercator distance (air nav) See rhumb line distance

Mercator's projection (nav) A map projection in which both parallels of latitude and meridians of longitude appear as straight lines It is a so-called cylindrical projection.

mercerizing (text) A treatment of cotton yarn, thread, or fabric with a strong solution of sodium hydroxide under tension The treatment renders cotton permanently more lustrous and stronger, and gives it a greater affinity for dyestuffs.

merchant iron (metal) Puddled iron after it has been reheated and rerolled. Also called merchant bar

mercury-arc rectifier (rad) A rectifier which makes use of the rectifying properties of an electron-emitting cathode and non-electron-emitting anodes enclosed in a chamber containing mercury vapor

mercury-vapor rectifier (rad) See mercury-arc rectifier

mercury-vapor tube (el) A gas tube in which the active contained gas is mercury vapor

Mergenthaler linotype (print) See linotype.

meridian (surv) The meridian of any observer is the great circle on the celestial sphere which passes through the celestial poles and the observer's zenith.

Merino (text) 1 Name of a breed of sheep 2. A yarn made of a mixture of cotton and wool.

meshing (aut) The mating or engaging of the teeth of two gears

meso-compounds (chem) These compounds have an even number of asymmetric carbons, the members of any pair having a rotation tendency equal to each other, but opposite in sign, so that the total effect is of no optical activity

messenger (el) The longitudinal wire or cable of a catenary system from which the contact wire is suspended, either directly or indirectly In compound catenary construction the top messenger carrying all of the load is termed the primary (or main) messenger and the one suspended from it to which the contact wire is attached is termed the secondary, messenger

messroom (ship) A dining room on a ship.

metal arc cutting (weld) The process of severing metals by melting with the heat of the metal arc.

metal arc electrode (weld) Filler metal in the form of a wire or rod, either bare or covered, through which current is conducted between the electrode holder and the arc.

metal arc welding An arc welding process wherein the electrode supplies the filler metal in the weld.

metal brazing process (weld) A dip brazing process wherein the filler metal is obtained from the molten metal bath. See also brazing

metallic circuit (tg-tp) A circuit of which the ground or earth forms no part

metallic return circuit (el) A type of electric power distribution circuit for vehicles wherein grounded parts are not used as a portion of the circuit.

metalliferous (metal) Said of any substance containing a metal.

metallography (metal) That branch of metallurgy that treats of the structure and physical properties of metals and alloys

metalloid (chem) Having the nature or properties of a metal.

metallurgy That branch of science which deals with the production, processing and treatment of metals and alloys.

metal spraying (metal) 1 A process of spraying molten metal to produce a metallic powder 2 A metallic coating or plating process wherein either molten or pulverized metal is projected at great velocity upon the surface to be coated.

meteorograph (aer) A recording instrument for obtaining meteorological information above the earth's surface. It contains elements to record temperature, pressure, and humidity. Also called "aerograph."

metering pin (aut) A pointed pin similar to the needle of a needle valve. With its use the size of a carburetor's fuel inlet is regulated.

methane. See marsh gas.

metric system. A system of weights and measures depending upon the meter in which the original factors are derived from the meter.—The system includes measures of length, of which the *meter* is the unit, measures of surface, of which the *are* is the unit, measures of capacity, of which the *liter* is the unit, and weights, of which the *gram* is the unit. The metric system is based on decimals or multiples of ten. It was first introduced in France and is now used internationally by scientists. See appendix for complete tables of the metric system.

metric ton. 2204.6 pounds avoir., equals .9842 long ton. To find the number of gallons in a long ton divide 224 by the specific gravity of the oil. 1 Metric Ton equals 7.2 barrels of 42 U. S. Gallons.

mezzotint engraving (art). A method of copperplate engraving in which the entire surface of the plate is slightly roughened, after which the drawing is traced and then the portions intended to show highlight are strengthened. An impression made from a plate so produced, characterized by an even graduation of tones, is called a "mezzotint."

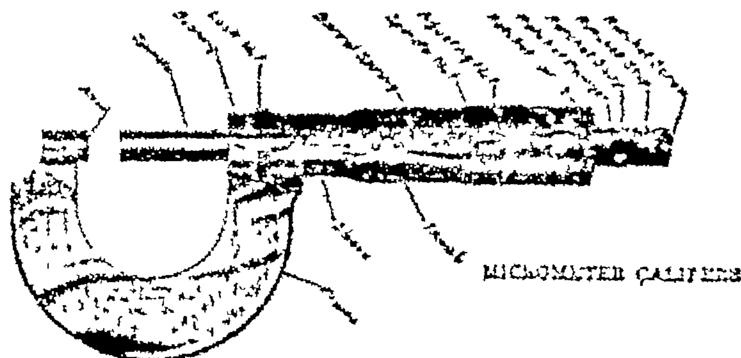
Mho (el) A unit of measurement of transconductance which is measured in reciprocal ohms. "Mho" is "ohm" spelled backwards. An mho is equal to one billion (10^9) abmhos. The unit is frequently encountered in discussions of the transconductance of radio tubes.

M. P. H. (aut). Miles per hour

mica (min) A group of mineral silicates with varying composition. They readily separate into thin sheets which are rather elastic. They are crystalline in structure. Used for electric insulation, as a substitute for glass in stove doors, goggles, gas masks, screens, windows, etc. When ground into powder, they may be used in paints, wall paper, tiles, lubricants, textile printing, oil-cloth and rubber fillers.

micelle (chem). A particle of the dispersed phase in a colloidal system.

micrometer calipers (mach) The most commonly used adjustable gage. It consists of a frame, anvil, spindle, barrel (or sleeve), screw, and thimble. Microm-



MICROMETER CALIPERS

(Courtesy L. S. Starrett Co.)

meters are generally intended to measure distances to one ten-thousandth of an inch, the measurement is usually expressed or written as a decimal. There are three types the outside micrometer (including the screw thread micrometer), the inside micrometer, and the depth micrometer The mechanical principle embodied in the construction is that of a screw of definite pitch, advancing in a fixed nut. An opening to receive the object to be measured is afforded by the backward movement of the screw, and the size of the opening is indicated by the graduations The pitch of the screw or distance between its threads, 40 to the inch, and the graduations on the barrel are figured 0, 1, 2, etc., at every fourth division. As these graduations conform to the pitch of the screw, each division equals the longitudinal distance traversed by the screw in one complete revolution, and shows that the calipers had been opened 1/40th or 25/1,000ths.

micron. A unit of length, the thousandth part of a millimeter, or the millionth part of a meter, it is used in measuring ether wavelengths. Usually designated by the Greek letter μ (mu)

microphone. A term frequently used as a synonym for telephone transmitter, particularly in the radio and sound picture fields. See telephone transmitter

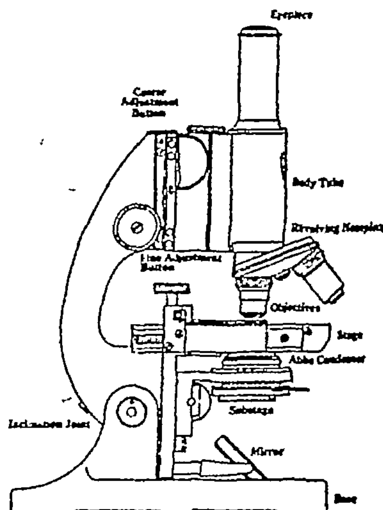
microscope. See compound microscope, electron microscope

microscopy The study of minute particles with the aid of the microscope

middle latitude sailing (nav) Sailing on the middle latitude of two places, i.e., sailing on the parallel of latitude midway between the parallels of latitude of the two places

midship (ship) The vertical transverse section located at the mid point between the forward and after perpendiculars. Usually this is the largest section of the ship in area.

midwing monoplane (aer) A monoplane in which the wing is located approximately midway between the top and bottom of the fuselage.



Mechanical Construction of the Microscope
(Courtesy, Bausch & Lomb Optical Co.)

military rating (of aircraft engines) The maximum horsepower permissible for 5 to 15 minute periods. Such ratings are established by the Air Forces to define the limitations incident to military maneuvers. (In addition to the regular "Military Rating" there is also a special "War Emergency Rating" to meet the needs of actual combat operations)

milky (phot) Term used to describe the appearance of an incorrect fixing bath, often the result of using impure chemicals or of improper mixing

milled (text) See fulled

mill file (mach) A single-cut, tapered or blunt file used in filing mill or circular saws.

millibar (met) A unit of pressure used in measuring atmospheric pressure. 1016 millibars equal 30 00" (approximately). One millibar equals 0 0295299 inch of mercury

mill waste (text) A general term for the byproducts of various mill operations.

millwright (mach). One who instals machines and equipment in shops.

mineral. A mineral is a body produced by the processes of inorganic nature, having a definite chemical composition and, if formed under certain favorable conditions, a certain characteristic molecular structure as exhibited in its crystalline form and other physical properties. A mineral must be a homogeneous substance, even when minutely examined by the microscope, further, it must have a definite chemical composition capable of being expressed by a chemical formula. The term mineral, when employed in a conveyance, is understood to include every inorganic substance that can be extracted from the earth for profit, whether it be solid as rock, fire clay, the various metals or coal, or fluid as mineral waters, petroleum, or gas.

minimum flying speed (aer). The lowest steady speed that can be maintained, with any throttle setting whatsoever, by an airplane in level flight at an altitude above the ground greater than the span of the wings.

minimum gliding angle (aer) The acute angle between the horizontal and the most nearly horizontal path along which an airplane can descend steadily in still air when the propeller is producing no thrust.

minor diameter (mach) The smallest diameter of a screw thread.

minuend (math) The number from which the subtrahend is subtracted.

minute mark (print) The mark (') used to denote geographical or chronological minutes. Two marks (") denotes seconds. This character is also used in other ways, as in dimensions, [illegible], etc., to indicate [illegible] in [illegible], in [illegible], and [illegible] forms, and in place of [illegible], to express feet and inches, as 5' 6".

misfire [illegible] A failure of the engine to fire regularly or to complete the cycle of operation.

miss stays (nav) To fail to get about when an attempt is made.

miter (carp) The joint formed by two abutting pieces meeting at an angle.

miter (ship) To match angles, an angled cut made for a joint.

mixer (foundry) A large vessel for keeping and mixing the molten pig iron from several blast furnaces.

mixer tube (generally, in superheterodyne receivers) A mixer tube is one in which a locally generated frequency is combined with the carrier-signal frequency to obtain a desired beat frequency.

mixing chamber (weld) That part of a gas welding or cutting torch wherein the gases are mixed for combustion.

mks electromagnetic system of units. The mks system of units is an absolute system of units which is based on the meter, kilogram and second, and which is extended to the electrical units by the measurement of current by its magnetic effects and of potential difference by the power unit current. The mechanical units of the system are developed by means of the recognized equations of mechanics using unity as the proportionality factor in each equation, and inserting a new unit of force for which the name "newton" has been proposed. In this system, the joule is the unit of energy, and the watt the unit of power.

Mo (book) A Latin suffix, used in words like decimo (10), duodecimo (12), etc. Mo or mo is used as an abbreviation when added to certain numerals in order to indicate the number of leaves made by folding a sheet of paper, as 12mo, 16mo, 18mo, 32mo, etc.

modern roman (print) The general style of roman type face which is distinguished from the old-style of roman by greater regularity of shapes, more precise curves, and delicate hair lines and serifs. The first [illegible] type of this style was made by an Italian printer and typefounder Bodoni, about 1792. It has since been very generally used, especially in books and newspapers.

though the old-style face has of late years grown in favor for miscellaneous work. A comparison of Caslon old-style with a modernized old-style letter will show the distinctive features of each.

modulated quantity (el) A combination of two or more oscillating quantities which result in the production of new frequency components not present in the original oscillating quantities Example in communication, one of the oscillating quantities of a modulated quantity is called a carrier and the other a signal.

modulated wave (rad) A combination of two or more waves which results in the production of frequencies not present in the original waves, these new frequencies being ordinarily made up of sums and differences of integral multiples of the frequencies present in the original waves As an example a modulated wave which is a combination of a carrier wave and a signal wave is employed to transmit signals or speech through a particular physical system. In this case the frequency of the modulated wave is usually taken as the frequency of the carrier wave.

modulation (rad) The process whereby the amplitude (or other characteristic) of a wave is varied as a function of the instantaneous value of another wave. The first wave, which is usually a single-frequency wave, is called the "carrier wave;" the second wave is called the "modulating wave."

modulator (rad) A device to effect the process of modulation. It may be operated by virtue of some non-linear characteristics or by a controlled variation of some circuit quantity

modulus of elasticity (in shear) (StM) Ratio of stress within the proportional limit to the corresponding angular strain (in radians) The following theoretical relation exists between the modulus of elasticity in shear and the modulus of elasticity

$$G = \frac{E}{2(1+\lambda)}$$

where G is the modulus of elasticity in shear, E, modulus of elasticity and λ, Poisson's ratio It is difficult to make a direct experimental determination of G on account of the presence of other stresses. It is usually determined by the torsion of a round bar

modulus of elasticity (in tension or compression) (StM) Ratio of stress within the proportional limit to the corresponding strain as determined with a precise extensometer. Accurate determinations of the modulus of elasticity are made with a gage length at least 8 inches (203.2 mm.) in length. Also known as Young's Modulus.

modulus of rupture (StM) Maximum stress in the extreme fiber of a beam tested to rupture as computed by the application of the flexural formula to stresses above the transverse proportional limit. For simple rectangular beam with concentrated center load it equals

$$S = \frac{1.5 \times \text{load} \times \text{span}}{\text{area} \times \text{depth}}$$

modulus of rupture in torsion (StM) See torsional strength.

mohair (text) 1. The hair of the Angora goat. 2 Fabric practically the same as brilliantine, also called Alpaca. 3 Pile fabric with back of cotton wool and pile of mohair, cut and uncut loops.

moist air island (met) An isolated region of moist air surrounded by drier air.

moist air tongue (met) An elongated region of moist air

moisture (text). The moisture present in a textile material as determined by definite prescribed methods, expressed as a percentage of the original weight.

moisture regain (text) 1 General: The moisture present in a textile material as determined by definite prescribed methods, expressed as a percentage of the oven-dry weight 2. Commercial An arbitrary figure formally adopted as the regain used in calculating the commercial or legal weight of shipments or deliveries of any specific textile material. 3 Standard (individual samples) The

moisture regain of a sample of textile material when brought from a lower moisture regain into equilibrium with the standard atmosphere. The lower moisture regain may be that reached at equilibrium in any atmosphere having a relative humidity between 5 and 50 percent.

moisture repellent. So constructed or treated that moisture will not penetrate. Compare "moisture-resistant."

moisture resistant. So constructed or treated that it will not be injured readily by exposure to a moist atmosphere. Compare "moisture-repellent."

molar gas constant (chem-phy) The constant R, in the General Gas law, PV=nRT, where P= pressure, V=volume, n =number of moles and T=Temp in °A. It is equal to 0 08204 liter-atmospheres.

molar weight. (abbr) Gram molecular weight.

mold (ship). A pattern or template. Also a shape of metal or wood over or in which an object may be hammered or pressed to fit.

molded breadth (ship). The breadth, measured amidships, at a ship's greatest breadth to the outside of the frames.

molded depth (ship). The extreme height of a vessel amidships, from the top of the keel to the top of the shelter deck.

molded line (ship). A working point, used to guide the structural alignment in accordance with the design.

molder (foundry) A foundry worker who makes molds for castings.

mold loft (ship) The large enclosed floor where the lines of a vessel are laid out and the molds or templates made.

mole (chem). Same as molar weight.

molecular heat (chem-phy). Specific heat multiplied by molecular weight.

molecule. The smallest part of a substance that can exist separately and still retain its composition and characteristic properties, the smallest combination of atoms that will form a given chemical compound.

moleskin (text) A fabric having a thick, soft nap and pile back, usually twill face like the fur of a mole. Made of cotton and used as a foundation for some artificial leather

molybdenum (Mo) A white metal used in steel alloys. At. wt. 96, at. no. 42, m.p. 2550° C, sp gr 8.6

moments (phy) The principle of the lever is that a small force applied at a great distance from the fulcrum will raise a large weight whose center of mass is only a short distance from the fulcrum If a rod is balanced horizontally over a knife edge and weights are hung from the rod, it will be found that a 12-pound weight suspended 1 foot to the right of the knife edge will be balanced by a 6-pound weight suspended 2 feet to the left of the knife edge or by a 4-pound weight hung 3 feet to the left of the knife edge. The product obtained by multiplying a force times the perpendicular distance from a point to the line of action of the force, is called the moment of the force about the point. If the action of the force is such as to tend to produce motion about the point in the same direction as the hands of a clock move (clockwise rotation) as viewed by the observer, the moment is said to be positive. If the tendency to rotate is counterclockwise, the moment is said to be negative For balance, the sum of all moments acting on a point must be zero.

momentum (phy) The product of mass and velocity

monatomic (chem) Said of a molecule consisting of a single atom.

Monel metal. A white metal containing 67% nickel, 28% copper, and 5% other metals such as iron, manganese, silicon and carbon. It can be drilled and tapped and handled in the machine shop as steel is. It may be drawn into wires and woven into cloth to be used in filtration of alkaline slurries. In the pulp and paper industry it is used for water traps.

Monel is used in winding wires for cylinder molds. Also in the aircraft industry for nuts, bolts, control parts, and seaplane floats

monitoring radio receiver A radio receiver arranged to permit a check to be made on the operation of a transmitting station.

monitoring room. The control room in a moving picture sound studio

monobasic (chem) Said of an acid in which the hydrogen atom is replaceable by only one basic atom or radical.

mono-block (aut) A term referring to cylinders which are cast in one block.

monocoque fuselage (aer) A fuselage construction which relies on the strength of the skin or shell to carry either the shear or the load due to bending moments Monocoques may be divided into three classes (reinforced shell, semimonocoque, and monocoque), and different portions of the same fuselage may belong to any one of these classes. The reinforced shell has the skin reinforced by a complete framework of structural members The semimonocoque has the skin reinforced by longerons and vertical bulkheads, but has no diagonal web members. The monocoque has as its only reinforcement vertical bulkheads formed of structural members.

monohydrated (chem) Applied to the state of a solid midway between dry and crystallized, that is, it contains less water of crystallization than the crystallized form but has more water than when in the dry form.

monomial (alg) A part of an algebraic expression connected or separated by mathematical signs only Example 2x.

monoplane (aer). An airplane with but one main supporting surface, sometimes divided into two parts by the fuselage.

monotype (print) A composing machine which casts individual types in the order of their use and sets them into justified lines of any length up to sixty pica ems. The monotype consists of two parts, one called the keyboard and the other the casting machine.

monovalent (chem) Said of an element whose atom is capable of combining only with a single atom of another element.

mooring (ship) Securing a vessel in position by means of cables or lines

mooring band (aer) A band of tape or webbing, over the top of a kite balloon, to which the mooring ropes are attached. It forms part of the mooring harness.

mooring cone (aer) The grooved conical member at the extreme bow of an airship which engages with a hollow cone at the top of the mooring mast and provides the coupling between the airship and the mooring mast.

mooring-cone outrigger (aer) The member, usually tubular, which supports the mooring cone at the bow of an airship, sometimes referred to as the "mooring spindle."

mooring drag (aer) Same as tail drag

mooring harness (aer) A system of webbing bands, fitted over the top of a balloon, to which the mooring ropes are attached, usually found only on kite or observation balloons.

mooring line (aer) A line attached near the bow of an aircraft for securing it to the ground, buoy, anchor, or to a mooring mast.

mooring lines (ship) Cables or hawse lines used to tie up a ship

mooring mast (aer) A mast or tower at the top of which there is a fitting to which the bow of an airship may be secured.

mooring pipe (ship) A round or oval opening in the bulwark framed with a cast iron rim or collar used for passing the mooring ropes, cables, etc., through.

mordant. An acid by which the biting is done in etching, an adhesive substance for fixing a color or wash on another substance.

mordant (text) A metallic hydroxide, or oxide, which is deposited on the fiber from a solution of its salts and which is capable of forming an insoluble colored compound with the dyestuff

morphology (bio) The study of form and structures.

Morse telegraphy. That method of telegraph operation in which the signals are formed in accordance either with the American or with the Continental (also called the International) Morse code.

mortise (carp) The hole which is to receive a tenon, or any hole cut into or through a piece by a chisel, generally of rectangular shape.

mortised joint (carp) A joint made by cutting a hole or mortise, in one piece, and a tenon, or piece to fit the hole, upon the other

mosaic print (phot) Prints covering sections of an area and pasted together to give a complete picture of the area. Generally used in aerial photography

Moseley number (chem) See atomic number

motive power unit (mech) The least number of wheel bases together with superstructure capable of independent propulsion, but not necessary equipped with an independent control.

motor (el) Technically applied to an electric motor. In correct usage also applies it to the power plant of a motor vehicle. The term "engine" should be used in referring to the power plant of a motor vehicle

motorcoach A heavy motor vehicle used for public transportation of passengers. It is commonly called a bus, and may be either a single or double decker.

motor generator set (el) A machine which consists of one or more motors mechanically coupled to one or more generators

mottled (phot) Describes the appearance of irregular spots on negatives or prints

mount (phot) Consists of heavy paper or cardboard, sometimes in the form of a folder, on which the print is mounted. The [illegible] of mounts are [illegible] or [illegible], plain [illegible] or embossed [illegible]

mountant (phot) An adhesive such as rubber cement used for mounting a print.

mousing a hook (rigging) Securing a load held in the hook by wrapping cord or twine across its mouth in such a way as to close it effectively

moving-coil instrument (el) See permanent-magnet moving-coil instrument.

moving-coil loudspeaker (dynamic loudspeaker) (rad) A moving-conductor loudspeaker in which the movable conductor is given the form of a coil

moving-coil microphone (rad) A moving-conductor microphone in which the movable conductor is given the form of a coil. This is sometimes called a "dynamic microphone."

moving iron instrument (el) An instrument which depends for its operation on the reactions resulting from the current in one or more fixed coils acting upon one or more pieces of soft iron or magnetically similar materials in the moving system. Various forms of this instrument (plunger, vane, repulsion, attraction, repulsion-attraction) are distinguished chiefly by mechanical features of construction. The above definition is not intended to include the polarized-vane type of instrument which is applicable to direct-current measurements only

MQ developer (phot) The common abbreviation for metol-hydroquinone developer

mucilages (chem) Salts, either with metals or organic bases, of polysaccharide sulfuric acid esters, which gel with water

muddy tones (phot) A print defect caused by excessive density due to overexposure and overdevelopment. The image appears "muddy"

mud sill. A cross beam for foundation of cable tool drilling engine, band wheel and Samson post. The lowest sill of a structure usually imbedded in the soil, the lowest sill or timber of a house, bridge, dam or dock.

mu factor (rad). The ratio of the change in one electrode voltage to the change in another electrode voltage, under the conditions that a specified current remains unchanged and that all other electrode voltages are maintained constant. It is a measure of the relative effect of the voltages on two electrodes upon the current in the circuit of any specified electrode. As most precisely used, the term refers to infinitesimal changes

muffler (aut) A system of pipes or passage-ways constructed so as to silence the exhaust explosions of an engine. It is connected to the end of the exhaust pipe.

mullion (carp) The construction between the openings of a window frame to accommodate two or more windows.

multicolor press (print) A press which completes a sheet in all its colors at one operation. It may be either a rotary or flat-bed press.

multielement tube (rad) See multiple-unit tube.

multigraph (print). A machine for the producing and printing of form typewriting Used for typewriting, it produces form letters (each an identical copy) at a speed of from 2,400 to 4,800 an hour. As a printing equipment it prints from special type or electrotypes which are attached to a small cylinder on the machine. The smaller machines are operated and fed by hand, but the larger and completely equipped have an automatic feed mechanism, electrical power drive, and self-inking attachment.

multiplane (aer) An airplane with two or more main supporting surfaces placed one above another.

multiple (math) Any number which contains another given number as an exact divisor. Example 6, 9, 12, and 30 are multiples of 3.

multiple circuit (el). Consists of two or more circuits connected in parallel.

multiple connection (el). The arrangement of cells in a battery by connecting all positive terminals together and all negative terminals together, the voltage of the group being only that of one cell and the current drain through the battery being divided among the several cells.

multiple projection welding. A projection welding process wherein two or more separate welds are made simultaneously in parallel.

multiple series connection (el) The arrangement of cells in a battery by connected two or more series-connected groups, each having the same number of cells, so that the positive terminals of each group are connected together and the negative terminals are connected together in a corresponding manner

multiple spot welding A spot welding process wherein two or more separate welds are made simultaneously in parallel.

multiple tuned antenna (rad) An antenna with connections to ground or counterpoise through tuning reactances at more than one point, these being so determined that their reactances in parallel present a total reactance equal to that necessary to give the antenna the desired frequency.

multiple-unit tube (rad) A vacuum tube containing within one envelope two or more groups of electrodes associated with independent electron streams. Sometimes called "multielement tube."

multiplex operation (tg) Multiplex operation of a telegraph system is simultaneous transmission of two or more messages in either or both directions over the same transmission path.

multiplication sign (math) Any symbol used to indicate that numbers or quantities are to be multiplied. The symbol X, the period, and the mere juxtaposition of two letters, or a number and a letter, can all be used as signs of multiplication.

multispeed motor (el). One which can be operated at any one of two or more definite speeds, each being practically in-

dependent of the load. For example, a direct-current motor with two armature windings, or an induction motor with windings capable of various pole groupings

mungo (text) The lowest class of remanufactured wool reclaimed from felted woolen fabrics.

Munsell photometer An instrument for testing pigments, paper and other materials that reflect light rather than produce it.

muntin (carp) The vertical member between two panels of the same piece of panel work. The vertical sash-bars separating the different panes of glass.

muriatic acid (chem). The commercial name for hydrochloric acid.

mushroom ventilator (ship). A short cast iron tube having a movable iron rod passing through its center On top of the rod is fixed a round metal cup which may be lifted to admit air or closed to prevent water entering tube. It is usually fitted over cabins.

muslin (text) A firm, plain, cotton fabric, either white or unbleached. Heavy and wide muslin is called sheeting Used for underwear and household purposes.

mustard gas (chem). Dichlorethyl sulfide, burns resemble X-ray and drug burns. They are slow healing and of periodic recurrence like the course of an infectious disease.

mutual inductance (el) The common property of two associated electric circuits which determines, for a given rate of change of current in one of the circuits, the electromotive force induced in the other

mutual inductor (el) An inductor for changing the mutual inductance between two circuits.

N

N. A. C. A. Abbreviation for National Advisory Committee for Aeronautics.

N. A. C. A. cowling (aer) A cowling enclosing a radial air-cooled engine, consisting of a hood, or ring, and a portion of the body behind the engine so arranged that the cooling air smoothly enters the hood at the front and leaves through a smooth annular slot between the body and the rear of the hood, the whole forming a relatively low-drag body with a passage through a portion of it for the cooling air

N. A. C. A. hood (aer) The ring portion of an N. A. C. A. cowling

nacelle (aer) An enclosed shelter for personnel or for a power plant. A nacelle is usually shorter than a fuselage, and does not carry the tail unit.

nadir (surv) The point where the prolonged plumb line intersects the celestial sphere directly underneath.

nails (carp) Nails are made of steel wire, with a flat driving head, either large or small, and a wood-piercing end, either pointed or blunt. Nails are classified as wire and cut nails. Cut nails are angular-sided, wedge-shaped, or blunt. Wire nails are round-shafted, straight, pointed nails, and are used more generally than cut nails. They are stronger than cut nails and do not buckle as easily when driven into hard wood, but usually split wood more easily than cut nails. Nails are made with special finishes (blush, cement, or resin) to increase their holding power. They may be galvanized to prevent rust. Wire nails come in a variety of sizes. For framing, large nails from 3½ to 6 inches long should be used, depending upon the size of the timber

nail set (carp) A small tool used to sink nails below the surface of the wood. It is a round steel, knurled shaft about 5/16 inch in diameter and 4 inches long. Its point is tempered to extra hardness, but its head is untempered and soft to prevent chipping. Points of nail sets vary from 1/32 to ⅛ inch in diameter

nainsook (text) A fine, smooth, soft cotton fabric, usually white, but may be tinted. Many grades

naphtha. The first cut in the distillation of petroleum. Crude naphtha is the term generally used for the first cut made in the distillation of petroleum. It may or may not require treatment with acids or steam distillation to meet trade demand as gasoline. This depends upon its color, odor and distillation characteristics. The term naphtha is also applied to the less volatile portion obtained on redistilling benzine. It is good practice to confine the designation "refined naphtha" to mixtures of light hydrocarbons intended for some purpose that requires a very good odor, such as dry-cleaning, varnish making, soap-making

Napierian logarithms (math) See natural logarithms.

napping (text) Pulling the ends of fibers to the surface of the cloth, to form a fuzz or pile. When done with teazel burrs the process is called teazeling. Outing flannel is an example of napped goods.

nascent (chem). Said of a chemical substance at the instant of its formation.

natural frequency (of an antenna) The natural frequency of an antenna is its lowest resonant frequency without added inductance or capacitance

natural gas. Occurs in underground pockets, and is often encountered in the drilling of oil wells. It is used for illuminating, heating and industrial purposes. Its basic constituents are hydrogen, methane (marsh gas), carbon dioxide, nitrogen, and certain hydrocarbons.

natural logarithms (math) Logarithms using the base e (2.71828183+). Sometimes called "Naperian Logarithms."

nautical mile (ship) The 60th part of an equatorial degree, equal to about 6,080 feet. Hence, 6 nautical miles represent 7 land miles, approximately.

naval brass This type of brass is much like manganese bronze in composition but lacks manganese and has only a trace of iron and sometimes aluminum. The wrought material is used for turnbuckles owing to excellent resistance to corrosion, ready machineability, and high tensile strength. Clinch nails are also made from the wire.

navigational plot (air nav). A diagram such as is used in navigation chart work in which lines indicate, by their direction and length, courses and distances made good over the ground.

navigation bridge (ship) The bridge used for taking observations, or directing the handling of the ship.

navigation light (aer). See position light.

needle gap (el). A spark gap in which the electrodes are needle points.

needle valve (aut). A type of valve used in common carburetors, the function of which is to regulate the amount of gasoline to be sprayed into the mixing chamber of the carburetor.

negative (phot) A photographic image on a film or plate in which the dark portions of the subject appear light, and the light portions dark.

negative acceleration (phy) See deceleration.

negative electricity The kind of electricity which predominates in a body composed of resin after it has undergone electrification by rubbing with wool.

negative electrode (el) The negative electrode in a primary cell is the body of conducting material which serves as the anode when the cell is discharging and to which the negative terminal is connected.

negative holder (phot) A glass or open-type holder which carries the negative and fits into a slot under the diffuser of an enlarger.

negative light modulation (television). Negative light modulation occurs when a decrease in initial light intensity causes an increase in the transmitted power

negative quantity (alg) Any quantity preceded by a minus sign.

negative terminal (pole). The usually accepted terminal to which the current returns after passing through the circuit.

Neoprene (chem) The trade name for a polymer of chloroprene which first made its appearance in 1931 It is a synthetic plastic and when first introduced it was known as Duprene. Because of its flame resistance it may be used as an outer sheath for electrical insulation. Also used for hose, beltings, general mechanical goods, tank linings where oil or high temperatures are encountered.

nephelometry (chem). The measurement of the concentration of dispersed particles, based on the measurements of the intensity of the Tyndall cone.

nephoscope (met) An instrument for observing and measuring the motions of clouds.

net (aer) See free-balloon net, gas-cell net, inflation net.

net (text) An open work material usually made on the lace machine. Also called netting.

netting wire (aer) Diagonal or circumferential wire netting fitted between the longitudinals over the entire hull of a rigid airship to transmit the lift of the gas cells to the structure.

net tonnage (nav) See tonnage.

net weight (aer) (stress analysis) The gross weight, less some specific partial weight. Very often the partial weight is tho dead weight of the wings, but it may be the useful load. The partial weight in question should always be clearly indicated by the context.

network (el) 1 An electric network is a system of interconnected admittances. The point at which three or more admittances meet is called a junction point of the network. An admittance connecting any two junction points is called an arm or branch of the network. A mesh within a network is a closed path through three or more junction points. 2 An aggregation of interconnected conductors, consisting of feeders, mains and services for the distribution of electric energy

neutral (aut) A term applied to the position of the transmission gears when none of the driven gears is in mesh with any of the driving gears.

neutral center (ship) The plane which is the geometrical center of the thickness of a plate.

neutral flame (weld) A gas flame wherein the portion used is neither oxidizing nor reducing

neutral oils. 1 Oils carrying paraffin which are obtained by the steam-distillation of paraffin-base petroleum after the second-grade illuminating oil has been run off Neutral oil carrying paraffin is known as "wax distillate." 2 Lubricants of medium viscocity and fire test, usually filtered, and obtained by the reduction of pressed distillate from wax oil or wax distillate.

neutron (el) An electrically neutral particle having about the mass of a proton. The positron and neutron have been so recently discovered and are of so rare occurrence as isolated entities that their properties are not well known.

neutron rays (phy) The neutron of mass 1 but possessing no charge, can be ejected with varying amounts of energy in cyclotron disintegration of matter See cyclotron.

newel (carp) The principal post at the foot of a staircase, also the central support of a winding flight of stairs.

new periodic law (chem) The chemical properties of the elements are a periodic function of their atomic numbers.

newton. The unit of force in the mks (meter-kilogram-second) system. See mks electromagnetic system of units.

Newton's laws of motion (phy) 1 Every body continues in its state of rest, or of motion with a constant velocity in a straight line, unless acted upon by some external force 2. Change of momentum is proportional to the force and to the time during which it acts, and is in the same direction as the force. 3 To every action there is an equal and opposite re action.

nickel (Ni) A hard lustrous white metal generally occurring in combination with sulphur or silica, and used principally in the manufacture of nickel steel. At. wt. 58.69, at. no 28, m.p 1452° C, sp gr 8 6-8.93

nickel plating (metal) The coating of a metal with nickel either by the electrolytic or chemical method.

nickel steel electrotype (print) An electrotype upon the surface of which a thin film of nickel steel has been deposited. Besides durability of face it withstands the chemical action of certain types of colored inks In making the nickel-steel electrotype, a metal composition (about 92% nickel and 8% steel) is deposited directly upon the wax or lead mold. The mold produces an exact duplicate of the original pattern

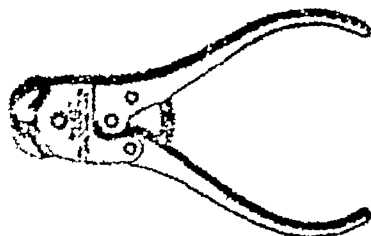
Nicol prism (phy) A specially constructed piece of calcite or Iceland spar ($CaCO_3$), which when ordinary light is passed

through, causes the emitted light to vibrate in only one plane, i.e., to be plane polarized

nippers (print). Slightly curved metal fingers fastened on a rod in the opening of a printing cylinder. They catch the edge of the sheet at the proper point as the cylinder revolves and release the sheet after the impression is made. Tweezers are sometimes called nippers.

nippers (tool). A type of pliers used strictly as a cutting tool for wire, light metal bars, bolts, etc., especially for cutting them off flush with the surface. They exert more force than pliers and should never be used as holding tools.

NIPPERS



(Courtesy L. S. Starrett Co.)

nipple (el) A straight piece of rigid metal conduit not more than two feet in length and threaded on each end.

nitrocellulose (chem) An amorphous yellowish white mass which is odorless and tasteless. Used for explosives, celluloid solutions, photographic films, lacquers, [illegible], [illegible] liquids and [illegible].

nitrocellulose rayon (text). Rayon from a [illegible] (not thread) cellulose which has been coagulated from a solution of nitrated cellulose.

nitrogen (chem) A colorless, odorless, tasteless gas constituting four fifths of the volume of air. At. wt. 14.008, at. no. 7 [illegible]

no-lift position (aer-[illegible]) The position in which the [illegible] would be at a given angle, if there were no wind.

noils (text) Short fibers from the combing of wool used to make worsted yarns. There are also silk noils and ramie noils.

nominal gas capacity (aer) The volume of the gas cell or cells of an aerostat under certain definite conditions of pressure and inflation.

non actinic (phot) Refers to those colors or rays of light which do not affect certain light-sensitive photographic emulsions.

non beat (weld) A provision in the operation controls of a welding machine to insure completion of the operating cycle after the cycle has been initiated.

nonferrous (metal) Not containing any iron.

non halation film (phot) Film provided with an opaque coating to prevent halation, i.e., the reflection of light from the back of the film.

nonmalleable (metal) Not capable of being worked to a useful degree.

non pressure welding A group of welding processes wherein the weld is made without pressure.

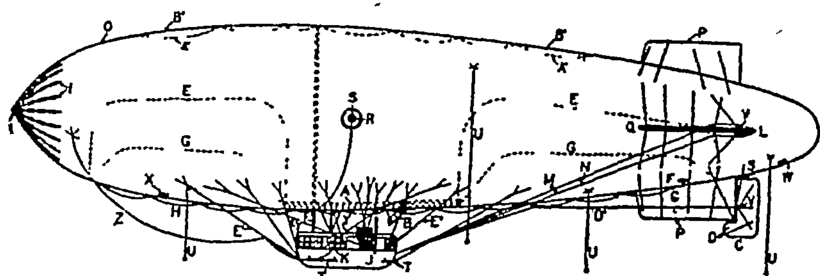
nonrigid airship (aer) An airship whose form is maintained by the internal pressure in the gas bags and ballonets. See illustration, page 204.

normal (chem). 1 A measure of concentration of a solution, equal to one gram equivalent of solute per liter of solution. 2 In organic chemistry the designation applied to straight carbon chain aliphatic compounds.

normal (math-phys) Perpendicular or at right angles, vertical, regular, uniform or standard, average or mean.

normal clear (RR) A term used to express the normal indication of the signals in an automatic block system in which an indication to proceed is always displayed except when the block is occupied.

normal Immelmann turn (aer) A maneuver made by completing the first half of a normal loop; from the inverted position at the top of the loop half rolling the



A, air pipe to ballonet
B, air scoop
C, air valve
D, balanced surface
E, ballonet
F, ballonet manhole
G, ballonet seam
H, ballonet valve cord
I, bow cap and stiffeners
J, car
K, drag rope stowage
L, elevator (balanced)
M, elevator controls
N, elevator-control fairlead
O, envelope
P, fin, vertical
Q, fin, horizontal
R, gas manhole
S, gas valve
T, hand rail
U, handling lines
V, horn (rudder elevator)
W, inflation sleeve
X, inspection window
Y, martingales
Z, mooring line
A', rip cord
B', rip panel
C', rudder (balanced)
D', rudder controls
E', suspension wires, car
F', valve controls

A nonrigid airship.

(Courtesy, National Advisory Committee for Aeronautics)

airplane to the level position, thus obtaining a 180° change in direction simultaneously with a gain in altitude.

normal landing (aer) A landing in which a path tangential to the landing surface and the loss in flying speed are attained at approximately the instant of contact. Also called "three-point landing"

normal load (stress analysis) The load on that part of a wing assumed to be unaffected by tip losses or similar corrections In any given case, it may be a basic, design, gross, net, or ultimate load, depending on the context.

normal loop (aer) A loop starting from normal flight and passing successively through a climb, inverted flight, dive, and back to normal flight.

normal pressure. Standard pressure, usually taken to be equal to that of a column of mercury 760 mm. in height and weighing approximately 14.7 pounds per square inch.

normal rating (aer-aut) The horsepower that an engine is considered capable of delivering continuously—without subjecting it to undue stress. The normal rating of an engine would be lower than the maximum brake horsepower that it is capable of developing

normal sag (el) The difference in elevation between the highest point of support of the conductor in a span and the lowest point of the conductor in the span (or in the curve of the conductor in the span produced).

normal spin (aer) A spin which is continued by reason of the voluntary position of the control surfaces, recovery from which can be effected within two turns by neutralizing or reversing all the controls Sometimes called "controlled spin."

normal temperature. In laboratory investigations, 20° to 25° C., or 68° to 77° F

norman pin (ship) A metal pin fitted in a towing post or bitt for belaying the line

north declination (nav) The celestial declination of a point which is north of the celestial equator It is always regarded as positive

north pole (el) The pole of a magnet from which the lines of force emanate

Norway pine (wood) See red pine.

nose-down (aer). To depress the nose of an airplane in flight.

noseheavy (aer) The condition of an airplane in which the nose tends to sink

when the longitudinal control is released in any given attitude of normal flight (cf tailheavy)

nose-over (aer) A colloquial expression referring to the accidental turning over of an airplane on its nose when landing

nose plate (sb p) A junction plate for the stem ends of port and starboard strakes above the top of the stem casting

nose up (aer). To elevate the nose of an airplane in flight.

nosing (carp). The part of a stair tread which projects over the riser, or any similar projection, the term applied to the rounded edge of a board

numerical coefficient (alg). The arithmetical number standing before a literal number Example in the term 2ab, 2 is the numerical coefficient of ab

nut (mach) The mating piece of a bolt or stud. Nuts are suited to assemblies that may have to be removed or taken apart. Wing nuts are especially useful where there is frequent occasion for hand adjustment. Castle nuts can be set immovable by a cotter pin placed through the slots provided in the nut and a hole in the bolt.

nylon (chem) A synthetic silk-like fiber. The generic name applied to all the superpolymers obtained from long-chain amino acids or from long-chain dibasic acids in combination with diamines. The chemical structure of nylons resembles that of proteins. Used for stockings, surgical sutures, fishing leaders, brush bristles, and parachute cloth.

O

oakum (nav-ship) A material made of tarred rope fibers, used for calking seams in a wooden deck.

objective (opt) The end lens of a telescope or a microscope nearest to the object being viewed as distinguished from the eyepiece lens

oblique drawing (draw) An oblique drawing is drawn on three axes similar to an isometric drawing except that one axis is drawn horizontally, one vertically, and one at an angle Measurements are laid out along these axes representing the length, breadth, and thickness of the object.

observation platform (aer) A small deck fitted on the top of an airship for a lookout and defense or for making observations used in navigating the airship

obstacle light (aer) See obstruction light.

obstruction light (aer) A red light which indicates the presence of a fixed object which is dangerous to aircraft in motion. Also called obstacle light.

occlusion (met) A frontal zone in which warm air is trapped above cooler surface air It results from the occluding of the warm sector of a cyclonic wind system.

occulting light (aer) An intermittent light in which the light interval is equal to or longer than the dark interval.

ochre (chem). An earthlike iron oxide used in paints Also called iron ochre or red ochre.

octane number (aut) See octane rating

octane rating (aer-aut) The antiknock rating given a gasoline. It is obtained by comparison with a standard or reference fuel. Also called octane number

octant (aer) A variation of the aircraft sextant which measures angles up to 90° Its artificial horizon is usually the bubble type

octavo (book) When a sheet of book paper about the size of 19 x 24 inches is folded into two leaves, it is called a folio, when folded into four leaves, a quarto (4to), into eight leaves, an octavo (8vo).

octode (rad) An eight-electrode vacuum tube containing an anode, a cathode, a control electrode and five additional electrodes ordinarily in the nature of grids.

O D (text) An abbreviation for "olive drab," which is the shade for some Army fabrics.

odometer (aut) A speedometer which records daily and total mileage.

oersted (el) The CGS electromagnetic unit of magnetic intensity. The oersted is the unit of magnetic intensity (magnetizing force) in the cgs electromagnetic system. At any point in a vacuum the value of the magnetic intensity in oersteds is equal to the force in dynes exerted on a unit magnetic pole placed at the point.

off-course correction (air nav) An angular correction applied to the course to parallel or to return to the original course in a given distance.

offset (s) pt. To bend out of line sharply. The points given by the draftsman to the loftsman for putting down lines.

offset (survey) A shift from a given direction perpendicular to that direction in order to pass an obstruction and yet obtain the total distance through the obstruction in the given direction. The distance across a pond in a given direction can be obtained by adding all the line segments in this direction which appear in a set of offsets (steps) going around the pond.

offset press (print) A press, used in lithographic printing, which prints by an indirect method, the impression being produced by the offset method. It consists principally of three cylinders of equal diameter, and an inking mechanism which includes a damping roller. The lower cylinder is the blanket cylinder covered with a sheet of rubber and coming in contact with the second cylinder which carries the printing surface. The third cylinder is the impression cylinder to which the paper is fed and which transfers the printing or design to the paper.

offset printing. One of the processes of lithographic printing in which the subject of a design is usually made first on a stone and then transferred to a zinc or aluminum plate which is curved to fit the cylinder of a press. The impression is made from the printing plate onto a rubber blanket from which the impression is offset on the paper [illegible]

offset screwdriver [illegible] A type of screwdriver [illegible] [illegible] [illegible]

oil [illegible] [illegible]

oil [illegible] [illegible]

ohm (el) A unit of measurement of electrical resistance. One ohm allows 1 ampere of current to flow through a conductor at 1 volt potential. An ohm is equal to one billion (10^9) abohms.

ohmmeter (el). An instrument for measuring electric resistance. Ohmmeters are provided with a scale usually graduated in ohms or megohms.

Ohm's law (el) Ohm's law states that the current in an electric circuit is directly proportional to the electromotive force in the circuit. Ohm's law does not apply to all circuits. It is applicable to all metallic circuits and to many circuits containing an electrolytic resistance. Ohm's law was first formulated for a circuit in which there is a constant electromotive force and an unvarying current. It is applicable to varying currents if account is taken of the induced electromotive force resulting from the self inductance of the circuit and of the distribution of current in the cross-section of the circuit. ($E=IR$ or $R=\frac{E}{I}$)

oil box (mach) Channels on a machine containing oily waste which allows the oil to seep slowly upon the bearing.

oil cooler (aer sci) Equipment for cooling engine lubricating oil to keep it within the proper temperature range.

oil cup (mach) An oil-feeding device on a machine into which the lubricating oil is poured.

oiled silk (text) Thin silk, soaked in drying oils and resins, and dried. [illegible] proof and fairly pliable.

oil feeding reservoirs (el) Oil storage tanks located at intervals along the route of an oil-filled cable or at [illegible] [illegible] for the purpose of keeping the cable constantly filled with oil under pressure.

oil-filled cable (el) A cable having a [illegible] [illegible] an oil which is [illegible] [illegible] [illegible]

which positive oil pressure can be maintained within the cable at all times, incipient voids promptly filled during period of contraction and all surplus oil adequately taken care of during periods of expansion.

oil hardening (metal) The process of hardening heated steel by quenching it in oil.

oil of vitriol (chem). A commercial name for sulphuric acid.

oil pan (aut). A term applied to the lower part of a crank case, whether it is used as an oil reservoir or not.

oilstone (carp) A fine-grained abrasive stone used for precise and smooth sharpening of tools. It comes in two varieties; the fine-grained natural stone, and the coarse-grained artificial stone. The coarse-grained stone has a rapid-cutting surface, while the natural stone has a slow-cutting surface. Oil-stones vary in size and shape, some are rectangular, others round. The rectangular oilstones are from 1 to 2¼ inches wide and from 3 to 8 inches long The round stone is about 5 inches in diameter.

oil switch (el) A switch in which the interruption of the circuit occurs in oil.

oil-tank vent (aer) A large tube used to conduct oil vapors from the engine to the oil tank.

oil tight (ship). Packed and calked to prevent flow or waste of oil.

Old English (print). The name given to a style of black letter or text made in many varieties.

Old Style (print) The two general classes into which roman type faces are divided are old style and modern. Innumerable varieties of both styles are made, and many of them are often difficult to place in one class or the other. In general the true old style in use today may be said to follow closely that of the Caslon form. This is an example of Old Style.

oleic acid (chem). An unsaturated liquid fatty acid, found in most fats and oils.

oleo gear (aer) A type of oil-damping device that depends on the flow of oil through an orifice for its shocking absorbing effect in a landing gear

oleoresins (chem) The sticky exudate of pine or fir trees, consisting of a solution of resin acids in essential oils. On standing, the essential oils evaporate, leaving a hard glass-like resin.

oleo strut (aer) A shock-absorbing telescopic strut in which an oleo gear is in corporated.

one-point drawings (draw) Those in which the object to be drawn is viewed in such a manner that one face is parallel to the front plane. In this style of perspective the horizontal lines of the front plane remain parallel, but the lines of all planes perpendicular to it meet at one point. The point at which the converging lines of a perspective drawing meet is called the vanishing point. Also called "parallel perspective drawing"

onionskin (paper) *A thin translucent* paper with a glazed or unglazed finish. Onionskin is thicker than tissue, and is used for various purposes, including manifolding and second sheets on typewriters. The particular characteristics of onionskin are transparency, strength, thinness for the weight, and the fact that the paper will lie flat at all times.

ooze leather (book) A thin soft leather made from sheepskin and calfskin by forcing "ooze" or tan liquor through its pores by mechanical means This leather is usually finished with the flesh side out, and is made in a variety of colors. It is used for bindings on small books and for college and school annuals.

opalescence (phot) A whitish appearance of the emulsion on a negative, suggesting the color of an opal, generally caused by the use of alcohol to hasten the drying of an insufficiently washed negative.

opalescent glass. Opal glass having the properties of selectively transmitting and diffusing light, with a resultant fire appearance when used with concentrated incandescent sources of light. It is sometimes referred to as fire opal.

opal glass. Highly diffusing glass having a pearly white, milky or gray appearance. The diffusing properties are an inherent, internal characteristic of the glass.

open amortisseur winding (el). A form of amortisseur winding having its conductors arranged in individually short-circuited groups that are not interconnected.

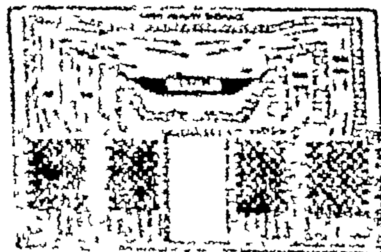
open circuit (el) A circuit through which no current can pass.

open-circuit voltage (el) The voltage of a battery at its terminals when no appreciable current is flowing.

open contact (el) A current-carrying member which is open when the operating unit is in the normal position.

open-end wrench (tool). A wrench which fits standard size nuts and is light, strong, and convenient for working in a limited space. Because the jaws are set at an angle (usually 15 degrees or 90 degrees) it is easy to increase the swing of the handle by turning the wrench over. Like socket wrenches it is often used in automotive work. Sets of midget open-end wrenches are available for ignition and electrical work.

open hearth furnace (metal) A regenerative reverberatory furnace for the production of open-hearth steel. See Siemens Furnace".



([illegible])

open hearth process (metal). A process for the production of steel in the open hearth furnace employing a charge of pig iron, scrap, ore, and coal or coke (carbon). In the "acid open hearth process" an acid lining is used in the furnace (i.e., silica bricks covered with fine sand); in the "basic open hearth process" a basic lining is used (i.e., magnesite bricks covered with crushed dolomite)

operating speed (aer) The speed in level flight corresponding to 87.5 percent of the rated speed of the engine.

operation factor (el) The ratio of the duration of actual service, of a machine or equipment, to the total duration of the period of time considered.

opposed piston engine (aut). An engine whose pistons lie opposite each other, generally in a horizontal position, with the crankshaft between the pistons.

optical activity (chem). The ability possessed by certain chemicals to rotate the plane of polarized light when the latter is passed through the substance.

optical center (print) The center of a page or sheet as it appears to the eye. This is often at variance with the actual or geometrical center, especially when judged by head and foot margins.

optical illusion (arch) An error to the average eye in the perception of certain lines, angles, and spaces It is taken into account in the designing of structures.

optical rotation (phy). The number of degrees of rotation that an optically active substance produces in the plane of polarized light for a given length of passage.

optics. The science that treats of light and vision.

orbit. The path of any object similar to that described by the planets in revolving around the sun while rotating themselves on their own individual axes.

ordinate (air nav-top). The perpendicular from a given point on a graph or map grid to the horizontal center line or abscissa. A perpendicular from a given point to the X-axis.

organic chemistry That branch of chemistry dealing with organic or carbon compounds

orlop deck (ship) The lowermost deck in a ship having four decks, lower deck. The first deck above the tank top

ornamental iron work (forge) A design or object generally of wrought iron either purely ornamental or designed to beautify some useful thing such as a railing, balcony, gateway, fireplace andirons, door knockers, hinges, lamps, etc.

ornithopter (aer) A form of aircraft heavier than air, deriving its chief support and propelling force from flapping wings

orographical clouds (met) Clouds formed in air rising along sloping terrain Very frequently orographical clouds are fog.

orographical rain (met) Rain falling from orographical clouds.

orthochromatic (phot) Color sensitive. A film or plate is said to be orthochromatic when it is sensitive to colors of the spectrum other than the blue and ultraviolet to which all negative materials are especially sensitive.

orthographic projection (draw) The process of projecting accurate outlines of views of an object and properly arranging them. This method may best be explained through a process of tracing views of an object on the sides of a transparent box, and then manipulating the sides of the box (and consequently the traced views) in a mechanical method simulating the theory controlling the location and arrangement of the views necessary to present a picture of the object.

oscillate (el-phy) To move or swing back and forth with a pendulum like motion.

oscillating current (el) A current which alternately increases and decreases in magnitude with respect to time according to some definite law

oscillating quantity (el) A quantity which, as a function of some independent variable (such as time), alternately increases and decreases in value, always remaining within finite limits. Example the discharge current from a condenser through an inductive resistance (provided the inductance is greater than the product of the capacitance times the square of the resistance)

oscillation (aer) See phugoid oscillation, stable oscillation, unstable oscillation.

oscillation (phy) Oscillation is applied to the state of a physical quantity when, in the time interval under consideration, the value of the quantity is continually changing in such a manner that it passes through maxima and minima.

oscillatory circuit (rad) A circuit containing inductance and/or capacitance and resistance, so arranged or connected that a voltage impulse will produce a current which periodically reverses

oscillograph (el) An apparatus for producing a continuous curve representing the instantaneous values of a rapidly varying electric quantity as a function of the time or of another electrical quantity.

oscilloscope (el) An instrument for making visible the presence and/or the nature and form of oscillations or irregularities of an electric current. There are several different types of instrument serving this general purpose which have been designated by this name.

osnaburg (text) A strong, unbleached cotton bagging, similar to heavy muslin. Kind of crash. Used for cement bags and sacks and target cloth A substitute for burlap

Otto cycle (aut). A cycle of four events which occur in a gasoline engine in the following order. 1. intake, 2. compression, 3 power, 4. exhaust.

out see copy (print) Marked on the margin of a proof to signify that the compositor has omitted something and directing him to refer to the copy

outboard (ship) Used to designate the distance from the center to the sides of a ship.

outboard profile (ship). A plan representing the longitudinal exterior of a vessel, showing a side of the shell, all deck erections, masts, yards, riggings, rails, etc.

outboard stabilizing float (aer). A stabilizing float placed relatively far out from the main float or hull of a seaplane usually at or very near the tip of the wing. Also called "wing-tip stabilizing float."

outer bottom (ship) That portion of the shell plating of a vessel forming the bottom.

outer skin (ship) The outside plating of a vessel.

outlet (el) A point on the wiring system at which current is taken to supply fixtures, lamps, heaters, motors or current-consuming equipment generally. The use of the term outlet for a point in the wiring system where a switch is located is deprecated, unless qualified to make the meaning clear.

output factor (el). The ratio of the actual energy output, in the period of time considered, to the energy output which would have occurred if the machine or equipment had been operating at its full rating throughout its actual hours of service during the period.

outside calipers (mach) Tools used for measuring outside dimension, as, for example, the diameter of a piece of round stock. The calipers should first be set approximately to the diameter of the work; then, when held at right angles to the center line of the work, adjusted until their points bear lightly on the surface of the work. Move the points back and forth slowly while adjusting them in order to get the "feel". When the adjustment has been made, the diameter can be read from a rule.

outside loop (aer) A loop starting from level flight and passing successively through a dive, inverted flight, climb, and back to normal flight, the pilot being on the outside of the flight path.

outside plating (ship) See shell plating.

outside sheets (paper) The top and bottom sheets of a ream or bundle of paper usually damaged and not included in the count.

outside strake (ship) A strake of plating which overlaps inside strakes with its upper and lower edges.

oven-dry weight (text) Also known as "bone-dry" weight. The weight of a textile material determined after drying by definite prescribed methods.

over all length (aer) The distance from the extreme front to the extreme rear of an aircraft, including the propeller and the tail unit.

overboosting (aer) Supercharging to a pressure higher than is safe for continuous operation. Although overboosting is dangerous when carried to extremes, it is frequently indulged in to increase the power for take-off, or under emergency combat conditions.

overcut (mach). The first series of teeth put on a double-cut file.

overdevelopment (phot) The result of too long an immersion in the developing solution.

overexposure (phot) Too lengthy an exposure of the light-sensitive material.

overhang (aer) 1. One-half the difference in span of any two main supporting surfaces of an airplane. The overhang is positive when the upper of the two main supporting surfaces has the larger span. 2. The distance from the outer strut attachment to the tip of a wing.

overhang (ship) The amount of a ship's hull projecting above and beyond a perpendicular from the water line at stem or stern.

overhead position (of welding) A position of welding in which filler metal is deposited from the underside of the joint and the face of the weld is approximately horizontal.

overlap (weld). Protrusion of weld metal at the toe of a weld beyond the limits of fusion.

overlapping of plating (ship). That portion of a strake of shell plating, etc., covering that of another strake.

overlapping strake (ship) See outside strake.

overlay (aer-phot) A transparent sheet of paper placed over a photograph or over mosaic strips to transfer data or control points.

overlay (print) A piece of paper put on the tympan to give more impression to a letter, line, or part of an engraving

overlay knife (print) A small flat piece of steel, about six inches long, with one end finely sharpened, especially adapted for cutting out paper overlays, a pressman's knife.

overpower protection (el) The effect of a device operative on the power delivered to an electric circuit in excess of a predetermined amount, to cause and maintain the interruption in the circuit.

overrun (paper) All paper direct from large mills is ordered by the "ton plus overrun," which means that the customer agrees to take the ton and up to five per cent over, and conversely, the customer must accept an underrun of five per cent as a "good delivery" It is impossible to determine the exact number of pounds that a given quantity of pulp will produce.

overshoot (aer) To fly beyond a designated mark or area, such as a landing field, while attempting to land on the mark or within the area.

overshot (text) Threads, as in pattern weaving, which skip over several warp threads at a time and so make a long thread over the plain weave or "tabby"

overspeed protection (el) The effect of a device operative on speed of rotating equipment in excess of a predetermined rate to cause and maintain the interruption of power to the protected equipment.

oxalic acid (chem) Poisonous crystals which are transparent and colorless. Soluble in water, alcohol and ether Used in the manufacture of celluloid, rayon, leather and textiles.

oxidation (chem) The loss of one or more electrons by a substance being oxidized.

oxidation (phot) As applied to developer, a deterioration due to the presence of oxygen. An oxidized developer is dark in color and usually causes discoloration of the negative or print.

oxidation-reduction potential (chem) The e.m.f. developable by a system capable of mutual oxidation and reduction. It is due to the flow of electrons from the oxidant to the reductant. Usually the potential is referred to an external standard electrode, as a standard hydrogen electrode. Example ferrous sulfate —ferric sulfate.

oxide (chem) The combined form of an element with oxygen.

oxidizing flame (weld) A gas flame wherein the portion used has an oxidizing effect.

oxter plate (ship). The name of a plate that fits in the curve at the meeting of the shell and the stern post at the counter

oxy-acetylene welding. A gas welding process wherein the welding heat is obtained from the combustion of oxygen and acetylene.

oxycellulose (chem) The product of progressive action of oxidizing agents on a cellulose, like cotton.

oxygen (O). A colorless, odorless, and tasteless gas forming one-fifth of the atmosphere by volume. It combines to form oxides with all elements except fluorine. Supports combustion. Used in rescue apparatus, high altitude flying, etc. At. wt. 16 00, at. no 8; m.p. -223° C; b p. -182.5° C., sp gr. 1.1050.

oxygen cutting (weld). A process of severing ferrous metals by means of the chemical action of oxygen on elements in the base metal at elevated temperatures.

oxygen grooving (weld) A process of forming a groove in the surface of fer-

rous metals by means of the chemical action of oxygen on elements in the base metal at elevated temperatures.

oxygen machining (weld). A process of shaping ferrous metals by oxygen cutting or oxygen grooving

oxy-other fuel gas welding A gas welding process wherein the welding heat is obtained from the combustion of oxygen and any fuel gas other than acetylene.

ozokerite (chem). A resinous mineral wax of the paraffin series It is a mixture of hydrocarbons in various proportions, the exact nature of which is somewhat in dispute. In its pure state it varies in color from black or dark brown to light yellow, and in some cases has a dark greenish hue. Its principal source of supply is Galicia, in Europe.

ozonide (chem) The product formed by the addition of ozone (O_3) to a double bond. It has the structure which on hydrolysis breaks between the two carbons, thus affording a means of determining where the original double bond was.

P

pace-maker (chem) The substance whose rate of reaction in a series of linked reactions sets the pace for the series, lactic acid may be considered as the pacemaker in fermentation.

pacific iron (ship) A gooseneck fitting for securing the boom to the mast. See also gooseneck.

page proof (print) A proof taken after the matter has been made into pages. Also called "form proof."

pagination (print) The numbering of pages of a book or catalog

paint. A substance applied as a liquid coat for purposes of protection against corrosion or weathering, or for purposes of decoration. It consists essentially of coloring matter (the pigment), the principal constituent (the base), the fluid in which they are held in suspension (the vehicle), and if necessary a substance to hasten the hardening (drier)

painter (ship) A rope used in the bow for towing, or for securing the boat.

paint process (print) See silk screen stencil.

paint screen; process (print) See silk screen stencil.

paired cable (el) (non-quadded cable) A cable in which all of the conductors are arranged in the form of twisted pairs, none of which is arranged with others to form quads.

palmitic acid (chem) A saturated fatty acid, found in animal and vegetable fats.

pancake landing (aer). A landing in which the leveling-off process is carried out several feet above the ground, as a result of which the airplane settles rapidly on a steep flight path in a normal attitude.

panchromatic (phot) Term applied to a film sensitive to *all* colors, recording them more in the relative brightnesses as seen by the eye.

pane (tool) *See peen.*

panel (aer) A portion of an airplane wing constructed separately from the rest of the wing to which it is attached.

panel (aerostat) 1. The unit piece of fabric of which the envelope or outer cover of an aerostat is made. 2. In rigid airships, the area bounded by two consecutive longitudinals and two consecutive transverses

panel (el), A switchboard unit made up of one or more sections for mounting on common supports and drilled for or having mounted thereon switchgear apparatus

panel light (aut) A lighting unit mounted either in the rear panel or in the corners of a closed vehicle.

panoramic camera (phot). A camera for taking continuous views and large groups. With it several hundred persons can be photographed at one time by posing them in a semicircle The camera is provided with a mechanism which permits it to revolve through the arc of a semicircle, and at the same time unwinds the film behind the exposure

slot. This type of camera is used in photographing terrain for purposes of making a photographic survey

panting (ship) The pulsation in and out of the bow and stern plating as the ship alternately rises and plunges deep into the water

panting stringer (ship) A horizontal stiffener with a breast hook giving added strength against panting

pantograph (draw) An instrument for mechanically copying, tracing or cutting a design in duplicate either in the same size, or smaller or larger. It consists usually of four rods or arms held together by adjustable pins. Two points of this frame move in unison if a third point is held stationary, and if one of these two points is moved over the pattern a pen or cutting tool will reproduce at the other point

pantograph trolley (RR) A trolley, the collecting member of which is carried by a collapsible pantograph frame

paper birch (*Betula papyrifera*) Its wood is close grained and hard. Used mostly for paper pulp and fuel. Also for spools and shoe lasts. Wt. 38 lbs. per cu. ft. (air-dried) [illegible] crushing strength [illegible] lbs. per sq. in. Shearing strength parallel to grain [illegible] lbs. per sq. in.

papermaking The process or art of manufacturing paper from vegetable fibers, [illegible] water has been pressed [illegible]

paper [illegible] [illegible]

paper [illegible] [illegible]

in testing the bursting strength of paper, by giving on an indicating dial, the pounds pressure to the square inch required to rupture a sheet of paper

papier maché Mashed paper, a hard substance made from paper pulp mixed with size or glue which may be formed while soft into any desired shape. Used for printing matrices, dolls, mannikins, stage properties, etc.

parabola A conic section obtained when a cone is cut by a plane parallel to one of its sides. A paraboloid is a solid in which all sections parallel to a certain line are parabolas.

parabolic reflector A reflector in which all sections parallel to a certain line are parabolic curves.

parachute (aer) An umbrella like device used to retard the descent of a falling body by offering resistance to its motion through the air.

parachute canopy (aer) The main supporting surface of a parachute.

parachute flare (aer) A pyrotechnic device attached to a parachute and designed to illuminate a large area when released from an aircraft at an altitude.

parachute harness (aer) A combination of straps, buckles, and fastenings used to attach a parachute to the wearer.

parachute pack (aer). A parachute and its [illegible]

parachute rigger (aer). A person who [illegible] parachutes.

parachute [illegible] [illegible]

parachute [illegible] [illegible]

paraffin A waxy, [illegible]

paraffin duck (text) Canvas or duck treated with paraffin. Stiff, heavy, and waterproof.

paraffin paper A paper, usually quite thin, which is grease-proof and air-tight, articles wrapped with it do not stick to the paper It is made of wood pulp and paraffin wax. Used to wrap explosives, chemicals, and machine tools to protect them against moisture.

paraffin wax. A colorless, more or less translucent mass, crystalline when separating from solution, without odor or taste, and slightly greasy to the touch, consisting of a mixture of solid hydrocarbons, chiefly of the methane series. Refined paraffin wax is pure white, the better grade being of 25 colors in melted condition, and showing in solid state a translucent rather than an opaque whiteness. It is also practically odorless and tasteless, containing usually less than 0 5 per cent of oil, sulphur and moisture

parallax (phot) A term used to denote the relative movement which takes place between two objects at different distances from the eyes, as the eye is moved from one position to another

parallelogram of forces (phy) If two forces act on a point but their lines of action are not identical the following procedure must be resorted to A graph is constructed. Each force is represented by a line, the direction of the line being the line along which the force acts. The length of the line represents the magnitude of the force on some scale previously decided on. An arrowhead is always placed on the line to indicate the direction in which the force acts. The diagram is always constructed so that each of the two forces is acting away from the point representing the point on which the forces are acting Through the opposite end of each line which represents a force, a line is drawn parallel to the other force. A parallelogram is thus formed. A diagonal line is then drawn from the point to the opposite corner This diagonal line represents the resultant force

parallel perspective drawing See one-point drawings.

parallel sailing (nav) Sailing due east or west, sailing on a parallel of latitude.

paramagnetic material (el). A material having a permeability which is slightly greater than that of a vacuum and which is approximately independent of the magnetizing force.

parasite drag (aer) That portion of the drag of an aircraft exclusive of the induced drag of the wings

parasol monoplane (aer) A monoplane in which the wing is above the fuselage.

paravane (ship) A water plane with a protecting wing placed on the bottom forward end of the keel stem. An airplane-shaped device swung overboard on the end of a cable off mine sweepers, to cut cables

parcel of air (met) Any portion of the atmosphere segregated for purposes of study It can be as large or as small as desired by the student.

parchment (paper) A sheet of writing material prepared from the skins of goats, sheep, and other animals. Often made artificially from paper

parchment paper A thin, tough, transparent paper, made by specially treating unsized paper having a high rag content, it is used for wrapping of meats, butter, and other fats Vegetable parchment is a similar paper, but is made of vegetable fibers and rags. The name parchment is also applied to a class of high-grade printing paper made to resemble real parchment.

parentheses (alg) Parentheses in algebraic equations indicate that the quantities inside them are to be combined before undergoing any other arithmetical operations.

parent metal (weld) See base metal.

paris white See whiting

Parkerizing (metal) A coating process for the protection of metal against corrosion. In the process of Parkerizing,

the parts to be treated are immersed in a solution of phosphoric acid and manganese dioxide heated to the boiling point. The parts are allowed to remain in the solution until gassing ceases. They are then removed and dipped in oil. The resulting finish is similar to gun metal.

party line (tp) A subscriber line arranged to serve more than one main station. Provision is made for discriminatory ringing with respect to the stations of each subscriber on that line.

pass (weld) The weld metal deposited by one general progression along the axis of a weld.

pass sequence (weld). The method of depositing a weld with respect to its length.

paste (dry cell) Paste in a dry cell is a medium in the form of a paste or jelly containing electrolyte which lies adjacent to the negative electrode.

pasteboard (paper) Common board, made by covering middles with pastings. In the paper trade, bristols, weddings, or other stock which have been pasted together in two or more thicknesses; known as two-ply, three-ply, etc., according to the number of sheets pasted together. Also called "pasted stock."

[illegible] (ord) A [illegible] of special shape and [illegible] the extension of [illegible] [illegible] may be [illegible] to [illegible] [illegible] may be [illegible] [illegible]

pawl (mach) A pivoted tongue or sliding bolt which engages notches in another part, such as a ratchet wheel, to permit motion in one direction and prevent it in reverse.

pay load (acr) That part of the useful load from which revenue is derived, viz., passengers and freight.

pay load (aut) Ton capacity of a cargo vehicle expressed in tons to the nearest half ton. In tank trucks, the pay load is the gallon capacity. In passenger vehicles the pay load is the passenger capacity including operating personnel.

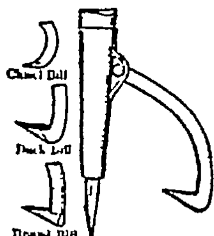
pay off (nav) To fall off from wind, said of the head of a sailing vessel. "To pay off" or preferably "to pay out", is also used to define the act of slacking line or sheet, so that it may be free to run, but without letting go.

peak (ship) The upper after corner of a quadrilateral fore and aft sail.

peak load (el) The maximum load consumed or produced by a unit or group of units in a stated period of time. It may be the maximum instantaneous load or the maximum average load, over a designated interval of time. Maximum average load is ordinarily used. In commercial transactions involving peak load (peak power) it is taken as the average load (power) during a time interval of specified duration occurring within a given period of time, that time interval being selected during which the average power is greatest.

peak tank (naut) Tank in the lower hold at either end of a vessel. The [illegible] use of peak tanks is in the [illegible] [illegible] [illegible] or [illegible]

peavy (lumber) An implement used to roll over heavy timber and logs. It consists of a wooden handle, with a spike and hinged hook resembling one half of an iceman's pick.



Peavy

pebble finish (paper) One of the many novel surfaces given to paper Like some other finishes, grained, linen, crimped, etc., it is produced by passing the sheets with strong pressure between steel rollers having a surface of the desired pattern.

pedals (text). The treadles which operate the heddles They are depressed by the feet of the operator, either one or two at a time according to the tie up They raise and lower the heddle frames, and the warp threads are drawn, half up and half down to form an opening or "shed" in the warp through which the shuttle is passed to weave the material.

peen (tool) The striking face of a hammer head. Also spelled pane, pean, etc. Hammers are termed ball peen, cross peen, and straight peen.

peening (weld) The mechanical working of metal by means of hammer blows.

pelorus (air nav) A circular bearing plate graduated in degrees, mounted so that it lies horizontally, and provided with sighting means, which when oriented may be used to determine true or relative directions of objects.

Peltier effect (el) When a current flows across the junction of two dissimilar metals it causes either an absorption or liberation of heat, depending on the direction of the current, at a rate proportional to the first power of the current.

penetrameter (radiography) A strip of metal of a thickness equal to a specified percentage of the thickness of the material under examination, and containing holes with diameters bearing a specified relation to the thickness of the strip, used to check the radiographic technique

penetration (weld) The penetration, or depth of fusion, of a weld is the distance from the original surface of the base metal to that point at which fusion ceases.

pentane (C_5H_{12}) A liquid hydrocarbon. One of the constituents of petroleum.

pentode (rad) A five-electrode vacuum tube containing an anode, a cathode, a control electrode and two additional electrodes ordinarily in the nature of grids.

penumbra. See umbra.

Perbunan (chem) Trade name for a synthetic rubber which is a copolymer of butadiene and acrylonitrile. It is also called Buna N Used for press roll covering material, for paper machines, in the handling of petroleum products, tank lining material, printers' rolls, motor mountings, conveyor belts, gasoline hose, packing, gaskets, tires for commercial trucks, and clothing

percale (text) A smooth, closely woven cotton material, usually printed. Has replaced high grade calico or print.

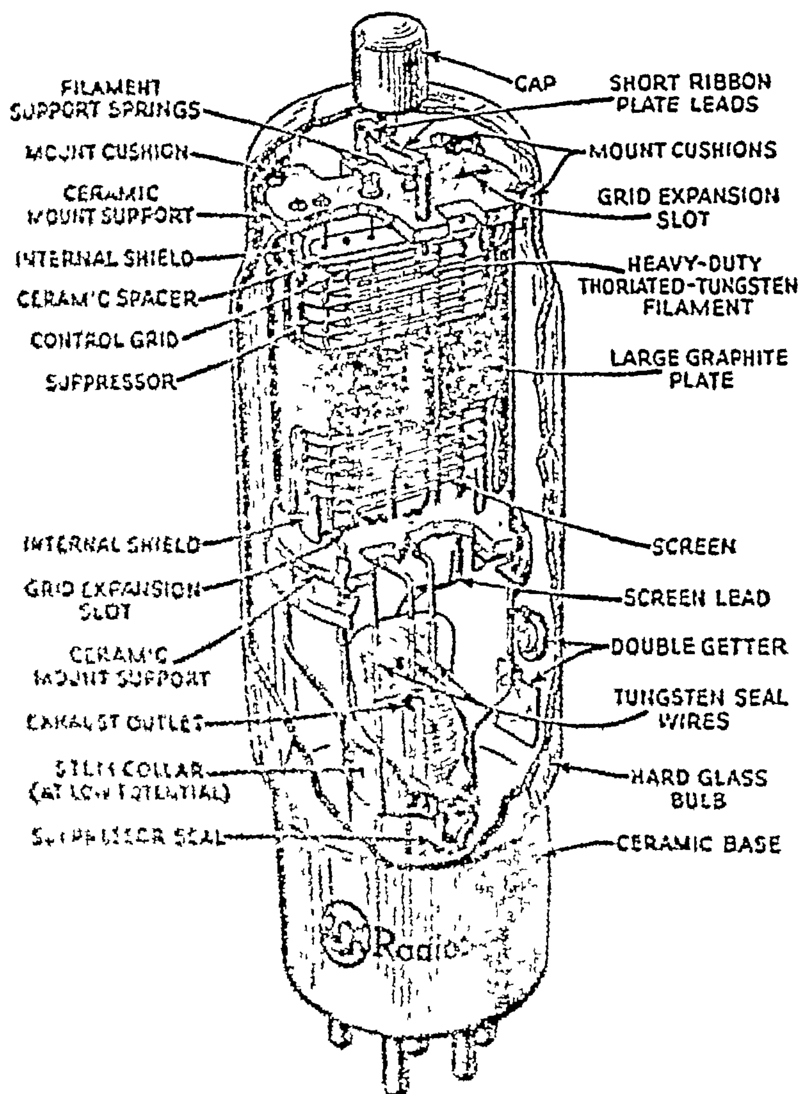
percentage modulation (rad) The ratio of half the difference between the maximum and minimum amplitudes of a modulated wave to the average amplitude, expressed in percent.

per cent solution (chem) One containing a certain percentage of a substance dissolved in water

perch (text) A machine used in the examination of cloth.

perching (text) The inspection of cloth during or after manufacture.

percussive welding A resistance welding process wherein a relatively intense discharge of electrical energy and the ap-



STRUCTURE OF TRANSMITTING PENTODE RCA-803

plication of high pressure (usually a hammer-like blow) occur simultaneously or with the electrical discharging occurring very slightly before the application of the pressure or hammer blow.

performance-type glider (aer) A glider having a high degree of aerodynamic refinement and low minimum sinking speed.

periodic law (chem) See Mendelejeff's law.

periphery. The circumference or perimeter of a circle or other closed, curved, or polygonal figure.

permanent-magnet moving-coil instrument (el) An instrument which depends for its operation on the reaction between the current in a movable coil and the field of a fixed permanent magnet.

permanent-magnet moving-iron instrument (el) An instrument which depends for its operation on the action of an iron vane in aligning itself in the resultant field of a permanent magnet and an adjacent coil carrying current.

permeability (aer) The measure of the rate of diffusion of a gas per unit area of any material used in the construction of a gas container

permissive block (RR) A block in manual or controlled manual territory, based on the principle that a train other than a passenger train may be permitted to follow a train other than a passenger train in the block.

persimmon (*diospyros virginiana*) A fruit tree yielding a heavy wood suitable for furniture, mallets, bench screws, and wagon shafts Wt. 53 lbs. per cu. ft. (air-dried) Maximum crushing strength 14,060 lbs. per sq in. Shearing strength parallel to grain 2,670 lbs. per sq in.

perspective (phot) The proportion of parts of a picture to one another in relation to distance.

perspective drawing (draw) Represents an object on a plane surface as it appears to the eye, and affords a better pictorial effect than other types of drawings See also one point drawing

pervaporation (chem) The evaporation of the dispersions medium from a colloidal system by suspending the liquid in a collodion bag, and heating If the liquid also contains crystalloids these deposit on the outside of the bag

petroleum A mixture of inflammable hydrocarbons, the origin of which is not definitely known. Petroleum deposits are usually associated with some form of folded or arched structure. (French, Huile Brute, German, Erdöl, Rohöl, Italian, Petroleo, Russian, Seeraya neft.) 1. An oily, inflammable, liquid mixture of numerous hydrocarbons, chiefly of the paraffin series, found in the earth. The petroleums found in different areas vary widely in composition and appearance. 2. The name commonly given to the liquid oils found in the earth. Petroleum is usually a homogeneous intersolution of many oils which are compounds of carbon and hydrogen.

pH (chem) The pH of an electrolyte is the cologarithm of the hydrogen ion activity of that medium It is a direct measure of acidity or an indirect measure of alkalinity

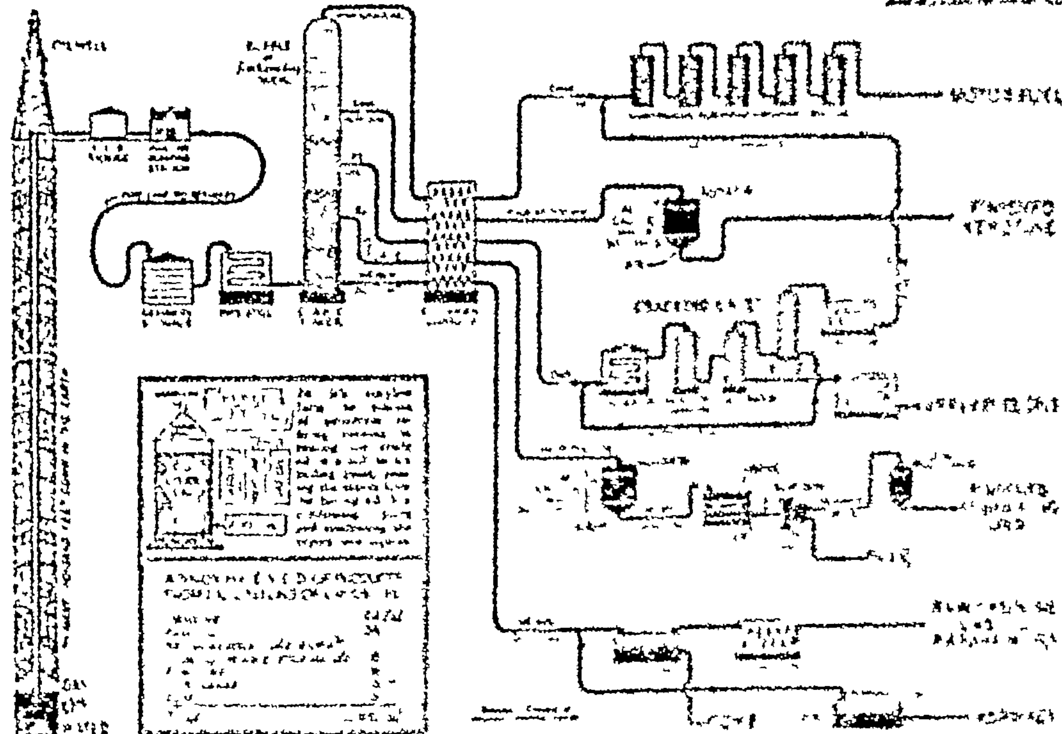
phaeton (aut) An open type body with two cross seats. Folding type windshield and folding weather-proof fabric tops with removable side curtains are usual equipment.

phantom circuit (tg-tp) A superposed circuit derived usually from either two two-wire or two four-wire circuits, all the circuits being suitable for the simultaneous transmission of currents in the same frequency range.

phantom section (draw) Indicated on an outside view by dashed cross hatching, and is used to show interior construction, the use of an additional view may occasionally thus be eliminated. Phantom sections are also used to indicate adjacent parts

phase advancer (el) A phase modifier which supplies leading reactive volt-amperes to the system to which it is connected. Phase advancers may be either synchronous or asynchronous

Typical FLOW CHART tracing crude oil from well to finished product



phase modifier (el) A machine the chief purpose of which is to supply leading or lagging reactive volt-amperes to the system to which it is connected. Phase modifiers may be either synchronous or asynchronous.

Phillip's screw (sheet metal) A four-point or cross-slot screw with a recessed head used for fastening sheets of metal from about 015 to 203 inch thick. These screws require a special screw driver for each size of head. They are widely used in the aviation industry

phonograph pickup (el) An electromechanical transducer actuated by a phonograph record and delivering power to an electric system, the electric currents having a wave form substantially identical with the waves in the phonograph record grooves.

phosphor bronze (metal) Phosphor bronze is usually considered as any copper-tin alloy to which phosphorus has been added as a deoxidizer The phosphorous is usually added in the form of phosphor-tin or phosphor-copper Phosphor-bronze containing less than 9 percent of tin and up to 0 25 percent phosphorus can be forged and resists corrosion. It is used for drawing into rod and wire. Phosphor-bronzes for casting purposes usually contain from 8 to 11 percent tin and from 9.25 to 1 0 percent phosphorus.

phosphorus (P) An element always found in combined form, in phosphates It has two allotropic forms, one yellow, the other reddish in color, poisonous and inflammable Yellow phosphorus ignites very easily and must be kept under water At. wt. 31.027, at. no. 15, m.p. 44° C, b p 269° C; sp gr (yellow) 1 82, (red) 2.25

phot (ph) The unit of illumination when the centimeter is taken as the unit of length, it is equal to one lumen per square centimeter

photo-aquatint (print) An engraving made by the photo-chemical process, the result being an intaglio copper plate from which impressions similar to photogravures may be made, a print made by this method.

photochromoscope (phot) An optical device for combining the three-color separation positives to form an image in full color

photoelectric cell (el) An electric cell capable of emitting electrons when actuated by electromagnetic radiation (light) It is used in talking picture apparatus, automatic door-opening devices, control instruments, and burglar alarms

photoelectric effect. Electromagnetic radiation (light) incident on the surface of a body may cause the emission of electrons For a body of a given material, the emission occurs only for a particular band of wavelengths of the incident radiation, and for a given wavelength, the rate of emission of electrons is proportional to the incident radiant flux.

photoelectric exposure meter (phot) An exposure meter utilizing the principle of the photoelectric cell. An attached scale indicates the stop opening and shutter speed necessary under different light conditions and with films of different speeds.

photo-engraving (print) The process of making, by means of the chemical action of light upon a film, engraved blocks for printing The term may be meant for intaglio as well as relief work, but in this country, it is usually applied to relief plates such as halftones, mezzographs, and zinc etchings. The intaglio plate is more commonly known as photo-aquatint, etc.

photo finishing (phot) The work dealing with the development of the negative, the printing, and the final mounting

photoflash lamp (phot) Resembles an ordinary electric light bulb but is filled with oxygen and crumpled aluminum foil and can be used only once When the current is turned on, the aluminum foil burns with a brilliant flash lasting about 1/50th of a second.

photoflood lamp (phot) A type of electric bulb giving about twelve times more light than an ordinary 60-watt bulb, but having a life of only two hours It is used for indoor photography

photographic mosaic (photo) See mosaic print.

photographic survey (photo) Two photographs are taken of the same area from different positions and then [illegible] on a map. Lines are drawn from these positions to each point and [illegible] can be identified in the photographs until the [illegible] survey is [illegible]. Also known as ground phototopography.

photogravure (print) A print and also the process of making a print from an intaglio engraving. There are numerous variations in the process as carried out by different workmen, but the general method is by chemically [illegible] a [illegible] on a metal plate, [illegible] with a photographic [illegible], the [illegible] of the light [illegible] of the [illegible]. The [illegible] are then washed away and [illegible].

photosynthesis (bot) The term photosynthesis might be applied to any synthesis [illegible] dependent upon radiant energy. Common usage of the term [illegible] to denote the assimilation of carbon dioxide by green plants under the influence of light, has resulted in fairly general acceptance of this more limited meaning.

phototopography (surv) See photographic survey.

phototropism (bot) Reaction of a living form to light.

phototube (el) [illegible] called "photoelectric tube." A vacuum tube in which one of the electrodes is [illegible] for the purpose of causing electrons to be emitted [illegible].

phugoid oscillation (aero) A long-period oscillation characteristic of the disturbed longitudinal motion of an aircraft.

pick-up voltage (el) The pick-up voltage (or current) of a magnetically operated device is the voltage (or current) at which the device starts to operate.

pictogram. Any figure showing numerical relations, as "bar graphs," "broken line graphs."

pictorial view (draw) The representation of an object as seen by an observer Pictorial drawings are seldom used by themselves as working drawings, but are generally used as illustrations where details of orthographic projection would not be easily understood. They have the advantage of requiring less training of the imagination to visualize a complicated object, and, in some instances, require less time to draw

picture element (television) The smallest subdivision of a television image arbitrarily defined by assuming equal vertical and horizontal resolution, the resulting elemental square having a dimension equal to the width of one scanning line.

picture molding (carp) A molding shaped to form a support for picture hooks, often placed at some distance from the ceiling upon the wall to form the lower edge of the frieze.

picture transmission. The electric transmission of a picture having a gradation of shade values.

piece dyed (text) Cloth dyed after weaving

pier (engr) An intermediate support of masonry, reinforced concrete, cribwork, or of several trestles so constructed as to form an integral unit.

piers (bldg) Masonry supports, set independently of the main foundation.

piezoelectric effect (rad) A crystalline dielectric, which is anisotropic and has no center of symmetry, becomes electrically polarized when it is mechanically strained. The direction and magnitude of the polarization depend upon the nature and amount of the strain, and upon the direction of the strain with reference to the axes of the crystal. On such crystals the converse effect is observed, viz., that a strain results from the application of an electric field.

piezoelectric loudspeaker (rad) One in which the mechanical forces are obtained by the use of a piezoelectric element.

piezometer (StM) An instrument used to determine the modulus of compression of a material.

pi-ing (print). The act of mixing type in confusion, accidentally pushing words or lines of type apart so that they fall off their "feet" and become scattered.

pilaster (bldg) A portion of a square column, usually set within or against a wall.

pile (text) The raised loops or tufts (cut loops) that form all or part of the surface of a pile fabric. Also known as pile fabrics

piles (bldg) Long posts driven into the soil in swampy locations or whenever it is difficult to secure a firm foundation, upon which the footing course of masonry or other timbers are laid.

pillar (ship). Any steel bar or column, fitted vertically, to support a deck, or any part of a ship's structure. Also called a stanchion

pillar file. A parallel-edge file with rectangular cross-section of narrow width and extra thickness.

pilot (aer) One who operates the controls of an aircraft in flight.

pilot (aut). A short plug at the end of a shaft to align it with another shaft or rotating part.

pilotage (air nav) The method of conducting an aircraft from one point to another by observation of landmarks either previously known or recognized from a map

pilot balloon (met) A small balloon sent up to show the direction and speed of the wind.

pilot light (aer) See indicator light.

pilot parachute (aer). A small auxiliary parachute attached to the apex of the main parachute, designed to pull the latter out of its pack when the rip cord is pulled.

pilot plane (aer). An auxiliary airfoil placed near the leading edge of a main airfoil and free to take up a position in line with the wind.

pilot rudder (ship). A small rudder fastened to the after part of the regular rudder, which by hydraulic action aids the main rudder to either side.

pilot wire (el). An auxiliary conductor used in connection with remote measuring devices or for operating apparatus at a distant point.

pima cotton (text). Cotton grown in Southern California and Arizona from Egyptian seed. Long staple fiber light tan in color.

pinch bar (tool). A tool, octagonal in cross-section with either one or both ends bent slightly. It is 18 to 50 inches long. One type of pinch bar is bent at both ends and has a [illegible] at one end, a claw at the other. Another type is bent at one end, has a [illegible] at the other end and a pinch point at the other. It is used [illegible] [illegible] has been [illegible].

[illegible]

[illegible]

[illegible]

pin insulator (el). A complete insulator, consisting of one insulating member or an assembly of such members with or without ties, clamps, thimbles or other accessories, the whole being of such construction that when mounted on an insulator pin it will afford insulation and mechanical support to a conductor which has been properly attached with suitable accessories.

pinion (mach). The smaller of two mating or meshing gears.

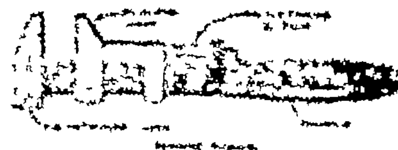
pin punch (tool). See punches.

pintle (sh. p). 1. A small straight piece of metal secured to the rudder and fitting in the gudgeon on the stern post of very small boats, thus supporting the rudder. Pintles and gudgeons are used on some of the rudder braces of larger boats. 2. A tapered metal pin which fastens the rudder to the stern post and affords an axis of rotation as the rudder is moved from side to side for steering.

pipefitter. One who cuts, threads, and connects pipes of all [illegible] [illegible] also pipefitters.

pipe saw (tool). A saw used for cutting [illegible]

pipe wrench (tool). A wrench used for turning pipe, round bars, [illegible]



[illegible]

[illegible]

[illegible]

piston displacement (aut) The amount of space displaced during one stroke of the piston Example assuming that with piston at top of stroke there is a volume of 10 cubic inches in the combustion space and that with piston at bottom of stroke the volume is increased to 63 cubic inches, the piston displacement would then be 63 minus 10, or 53 cubic inches for one cylinder The formula for calcuating piston displacement is as follows:

$d^2 \times .7854 \times S \times N =$ piston displacement.

Where d^2 is diameter or bore squared, this result is then multiplied by the constant .7854 (the area of a cylinder 1 inch in diameter); this result multiplied by S, the stroke in inches, and this result multiplied by N, the number of cylinders.

piston pin (aut) A pin running through the piston near or above its vertical center It connects the piston to the connecting rod.

piston rings (aut) Rings of spring steel that fit into grooves around the piston and prevent the explosion pressure from escaping between the piston and the cylinder wall.

pitch (aer) An angular displacement about an axis parallel to the lateral axis of an aircraft.

pitch (bldg). Inclination or slope, as of roofs or stairs, or the rise divided by the span.

pitch (mach) Distance apart of consecutive, equidistant things, as the distance from any point on a screw thread to a corresponding point on an adjacent thread, measured parallel to the axis, the distance from a point on a gear tooth to a corresponding point on an adjacent tooth, measured on the pitch line.

pitch (ship) The distance between the center of two contiguous objects, such as teeth of a wheel, etc. Also the distance a screw propeller would advance in one revolution if turning in a steadfast medium.

pitch (pile floor covering) (text) The average number of pile ends per inch counted in the filling-wise direction.

pitch board (carp) A board sawed to the exact shape formed by the stair tread, riser, and slope of the stairs and used to lay out the carriage and stringers.

pitch control (aer) A mechanism through which the angle or "pitch" of the propeller blades may be changed during flight in order to maintain maximum propulsion efficiency

pitch diameter (mach) Referred to as the effective diameter, and is equal to the major diameter minus the thread depth.

NOMENCLATURE IN
GEAR PITCH FORMULAS

P = diametral pitch or the number of teeth to one inch of pitch diameter
N = number of teeth.
D' = pitch diameter
s = addendum.
f = clearance at bottom of tooth.
s + f = dedendum.
t = thickness of tooth on pitch line
t'' = chordal thickness of tooth.
D'' = working depth of tooth.
D'' + f = whole depth of tooth
D = outside diameter.
D''' = bottom diameter
P' = circular pitch.
H = height of arc.
s'' = distance from chord to top of tooth.
θ = ½ the angle subtended by circular pitch.
M = module (in millimeters).

(Courtesy Brown & Sharpe Mfg. Co.)

pitch indicator (aer) An instrument for indicating the existence and approximate magnitude of the angular velocity about the lateral axis of an aircraft. Also called "pitching indicator"

pitching (aer) Angular motion about the lateral axis

pitch of a propeller (aer) See *effective pitch, geometrical pitch, zero-thrust pitch*

pitch of a roof. The quotient of the rise (height from the level of plates to the ridge) by the span (length of the plates); one-half of the slope of the roof.

pitch pine (gen. woods). Yields a coarse, resinous wood, and is largely used in making rough lumber and charcoal. Wt. 35 lbs per cubic foot (air-dried). Maximum crushing strength 7,8[illegible]0 lbs per sq in; shearing strength (parallel to grain) 1,370 lbs per sq in.

pitch ratio (aer). The ratio of the pitch to the diameter of a propeller.

pitch speed (aer). The product of the mean geometric pitch and the number of revolutions of the propeller in unit time.

pit marks (gen.) Fine holes or pits in the [illegible] of a [illegible], generally [illegible] by an [illegible] amount [illegible] in the [illegible] by two [illegible] of the [illegible].

pitot static tube (aer). A [illegible] combination of a pitot and a static tube. The difference between the two pressures [illegible] is a function of the velocity of flow past the tube.

pitot tube (aer). An instrument for measuring velocities of [illegible]

plan (bldg). A horizontal geometrical section of a building, showing the walls, doors, windows, stairs, chimneys, columns, etc.

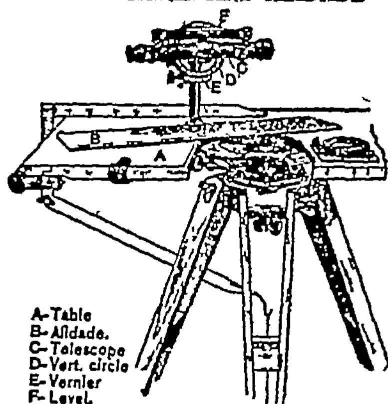
plane (aer). 1. Abbreviation for airplane. 2. To move through the water at such a speed that the support derived is due to hydrodynamic and aerodynamic rather than to hydrostatic forces. The latter term is synonymous with "to hydroplane."

plane (carp). A smoothing tool used to true the edge or surface of lumber where close fitting joints are required. There are several kinds of planes, each with a special use, but the general construction and method of operation of all planes are the same. Each plane has a straight face, an adjustable cutting blade, and a handle. Some different types of planes are: bench planes, fore planes, jack planes, block planes, etc.

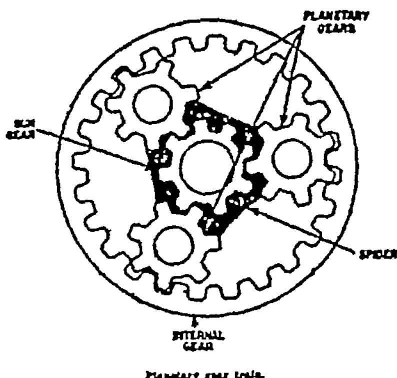
PARTS OF THE BENCH PLANE

tion. It consists of a drawing board on a tripod and a telescope or alidade which is pointed at the object observed.

PLANE TABLE AND ALIDADE



planetary gear (mech) A gear train consisting of a central or "sun" gear intermeshed with one or more "planet" gears.



Planetary gear train.

planigraph (draw) An instrument for reducing or enlarging drawings.

planimeter (draw) An instrument for measuring the area of any plane figure however irregular, by passing a tracer around the bounding line, a platometer.

planimeter (survey) A mechanical device for measuring plane areas Merely requires moving a pointer on the planimeter around the bounding curve. Also called a "polar planimeter"

plank sheer (ship) The outermost deck plank at the side.

planks (carp) Material 2 or 3 inches thick and more than 4 inches wide, such as joists, flooring, etc. Also called "lumber"

plant (mech) The fixtures, machinery, tools, apparatus, etc., necessary to carry on any trade or mechanical operation or process

plaster (bldg) A mixture of lime, hair, and sand, or of lime, cement, and sand, used to cover outside and inside wall surfaces.

plastic file. A file which comes in various types, used in flash removal and other finishing work on molded plastic products.

plasticity (phy) The resistance that a solid or semi solid offers to deformation of shape by shear or flow In many respects analogous to viscosity in a liquid.

plastic materials (StM) Those which are capable of undergoing considerable permanent deformation under compressive stresses.

plastics. Materials which under the influence of pressure and heat become soft enough to form, shape, or press into any desired shape, and when cooled, retain the form imparted to them There are two types of plastics, thermoplastic, and thermosetting The thermoplastic material softens when heated. On cooling it becomes rigid, and if it is reheated it softens again. This process may be repeated. Thermosetting resins undergo a chemical change under the effect of heat and pressure. They set permanently to a solid infusible mass. Examples: plastacele, plexiglas, bakelite, etc.

plate (bldg) The top horizontal piece of the walls of a frame building upon which the roof rests.

plate (print.) 1. A duplicate, in one piece of metal, of the face of composed types, engravings, etc. Such plates are made by electrotype or stereotype process. 2. A piece of metal engraved for impression on paper, etc., like a book plate, card plate. 3. A print made from an engraved plate. 4. A mechanical drawing.

plate (rad) A common name for the principal anode in a vacuum tube.

plate clutch (aut). A type of clutch having one plate clamped between two others. It consists of two driving plates and one driven plate.

plate cut (bldg). The cut in a rafter which rests upon the plate, sometimes called seat cut.

plate glass Plate glass is poured on a flat, heated surface, rolled until it becomes [illegible] and then rolled out to about twice the thickness intended for the finished glass. It is then annealed, ground with sand, and polished. A tempering [illegible] may follow, depending upon the type of glass and the use for which it is intended.

plate power supply (rad) The plate power supply of a thermionic vacuum tube is the means for supplying power to the plate of the vacuum tube at a properly [illegible] voltage which is usually positive with respect to the cathode.

platen (print) The flat part of the press [illegible], that which presses the sheets on the face of the type.

platen (mach) A flat working surface for [illegible] and assembling work.

platen press (print) That style of press [illegible]

[illegible]

[illegible]

platinum (Pt) A ductile metal which is silvery white and which does not tarnish at any temperature. It is harder than silver or gold. Used as a catalyst, for laboratory ware of all kinds, for electrodes and wires, for industrial equipment and electrical contacts. Sp. gr 21.45, m.p 1773.5° C.

play (mach) The difference between the diameter of a shaft, rod, etc., and that of the hole in which it works.

Plexiglas. Trade name for an acrylic plastic which is colorless, perfectly transparent and thermoplastic. It is available in the form of sheets and rods in a number of colors, both transparent and translucent. It is claimed that it can be readily machined and that it is lighter in weight than glass. It is practically unbreakable and more transparent than optical glass. In airplanes it may be used for windshields and other transparent sections. Also used in safety goggles.

pliers (el) Pliers are classified according to their length and shape of jaws. The most common types are *end cutting pliers* having blunt jaws, a scored gripping surface, side wire cutters, parallel tool surfaces, and strong handles; *long nose pliers*, having long, slender jaws, flat on the inside and scored gripping surfaces; *diagonal pliers*, having cutting jaws set at an angle from the handles.

Plimsoll line (ship). The mark stenciled in and painted on a ship's side, designated by a circle and horizontal lines to mark the highest permissible load water lines under different conditions.

Pliofilm. Trade name for a rubber hydrochloride. It is sold in the form of sheets or rolls. It is claimed to be resistant to moisture, water, oils, greases and most [illegible] solvents. It is also claimed to be very heat stable and flexible.

plow (carp) To cut a groove running in the same direction as the grain of the wood.

plowing (aero) Taxying a seaplane at low speed before rising on the step.

plug (el) A device, which, by insertion in a receptacle, establishes connection between the conductors of the attached cord and the conductors connected permanently to the receptacle.

plug (tp) A device to which may be attached the conductors of a cord and which, by insertion in a jack, establishes contact between the conductors of the attached cord and the conductors connected permanently to the jack. The plug most generally used has three separate contacting parts the tip, the ring, and the sleeve.

plug gage (mach) A gage used in production work to check inside and outside dimensions for size and to see that finished parts are within the manufacturing tolerance. The plug gage is a bar having a "go" end and a "no go" end, designed to gage the diameter of holes.

plug weld. A weld made in a hole in one member of a lap joint, joining that member to that portion of the surface of the other member which is exposed through the hole. The walls of the hole may or may not be parallel, and the hole may be partially or completely filled with weld metal.

plumbago (chem) See graphite.

plumb bob (instr) An instrument made of a conelike solid piece of metal (iron, brass, or lead), with one end pointed, the other fitted with a fixture to which a string may be attached so that when the bob is suspended the point falls directly under the center line of the string It is used to indicate a true vertical line, in surveying, carpentry, etc.

plumb cut (carp) Any cut made in a vertical plane, the vertical cut at the top end of a rafter

plush (text) A fabric having a strong, straight pile on one side. Made of silk, wool, cotton, rayon, or a mixture.

ply (bldg) A term used to denote a layer or thickness of building or roofing paper, as two-ply, three-ply, etc.

ply (text). 1. The number of single yarns twisted together to form a ply yarn. 2. The number of ply yarns twisted together to form a cord. 3 The individual yarn in a ply yarn or cord. 4. One of layer of fabrics.

plymetal. A special type of plywood with one or more outer or inner layers of sheet metal. The use of inner metal layers provides a fire-resistant background for attractive wood and veneer effects. This product may be used for elevator cabs and enclosures.

plywood. Modern plywood is bonded by means of resin adhesives which are prepared from condensation products of phenol and formaldehyde. The adhesive is spread over the surfaces and allowed to evaporate for a short time. The plies are then pressed together and the resin is cured. A solid and permanent bond is thus secured. Although this product is more expensive than the glue-bonded plywood its mechanical properties are superior The plywood thus formed can be bent and shaped to any form. Used in airplane construction. A structural advantage of high strength-weight ratio is obtained in this manner and production is also speeded up.

pM (metal). The pM of a metal M in any electrolyte is the cologarithm of the metal ion activity in that medium.

pneumatic release (phot). Consists of a rubber bulb attached to the shutter trip mechanism by a small rubber hose. The shutter is operated by pressure of the bulb

pOH (chem) A term, analogous to pH, sometimes used to express directly the degree of alkalinity of a solution.

point. 1. The front end of a file. 2. The end of a spark-plug or other electrode. 3. The end of a switch rail. 4. A designation of printer's type size.

point of departure (air nav). A specified position from which the course or track of the airplane is begun.

point of interception (air nav). The place where two moving objects make contact, having flown intercept tracks.

point system (print) The sizes of types now cast by American typefounders are graduated on a uniform scale known as the point system. The unit of the system is a division of space called a point ([illegible] of an inch), and all type bodies are multiples of, and are measured by it. Each size is described by its number of points.

poise (chem). The unit of viscosity. It is the force (in dynes) which, when exerted on a unit area between two parallel planes one square cm. in area and one cm. apart, produces a difference in streaming [illegible] between the two planes of one cm. velocity per second.

Poisson's equation (el) States that, at any point in an isotropic medium, the divergence of the electric displacement is proportional to the density of the electric charge.

Poisson's ratio (SM) The ratio of lateral contraction per unit of diameter to longitudinal extension per unit of length of a bar under tension within the elastic limit of material.

poke welding (push welding). A spot welding process wherein pressure is applied manually to one electrode only.

polar air (met) Air whose origin is or was the polar regions.

polar contact (el) A part of a relay against which the current carrying portion of the movable polar member is held so as to form a continuous path for current.

polar front (met) The principal frontal zone [illegible]

polariscope [illegible]

compensate for the change that the substance has caused in the plane of the light emerging from the first.

polarization (electrochemistry) A change in the potential of an electrode produced during electrolysis, such that the potential of an anode always becomes more positive (more noble), or that of a cathode becomes more negative (less noble), than their respective equilibrium potentials. The *polarization* is equal to the difference between the equilibrium potential for the specified electrode reaction and the dynamic potential, that is, the potential when current is flowing.

polarization (in a battery). The change in voltage at the terminals of the cell or battery when a specified *current* is flowing. It is equal to the difference between the actual and the equilibrium (constant open-circuit condition) potentials of the plates, exclusive of the IR drop.

polarized light (phy). See plane polarized light.

polarizer (el). A substance which when added to an electrolyte increases the polarization.

Polaroid. The trade name for a type of glass which consists of two ordinary glass sheets interposed with a layer of a special cellulose acetate fiber. This fiber contains crystals of alkaloidal iodide. Light is polarized in this manner. Used to eliminate glare in headlight lenses and sun glasses. Polaroid goggles, which are used by night fliers to get used to the dark, have recently been perfected.

polar planimeter (survey). See planimeter.

pole (el). A column of wood or steel, or a similar structure of some other material supporting overhead conductors, usually by means of arms or brackets, span wires or bridges. Broad base lattice steel supports are often known as "towers", narrow base steel supports are also known as "masts."

[illegible]

into reddish-brown dust. It will not attack water-soaked timber, but it will attack dry timber, either sound or decayed.

pole guy (el) A tension member having one end securely anchored and the other end attached to a pole or other structure, which it supports against overturning

pole piece (el) A piece of ferromagnetic material forming one end of a magnet and so shaped as to control the distribution of the magnetic flux in the adjacent medium.

pole shoe (el) The portion of a field pole facing the armature of the machine. It may be separable from the body of the pole.

pole trolley (RR) A trolley consisting of a rotatable base, a pole and a collecting member which is carried at the end of the pole.

polished plate glass. Glass whose surface irregularities have been removed by grinding and polishing, so that the surfaces are approximately plane and parallel.

polishing (metal) The smoothing of a metal surface by means of abrasive particles attached by adhesive to the surface of wheels or belts.

Polybutene (chem) Trade name for a synthetic rubber-like material which is a polymer of isobutylene. It does not vulcanize by the ordinary methods used in the curing of rubber Used in adhesives, calking compounds, plasticizer for waxes and resins, acid-resistant tank linings, gaskets, and packing. It also increases the impermeability of inner tubes, gas masks, and balloon cloth.

polymerism (chem) A change in the properties of a compound whereby the elements remain in the same percentage but assume different molecular weights.

polynomial (alg) An algebraic expression of two or more terms, as, $a + b$, or $x^2 - 2xy + 5y^2$

polyphase circuit (el) A group of alternating-current circuits (usually interconnected) which enter (or leave) a delimited region at more than two points of entry, and which are intended to be so energized that in the steady state the alternating currents through the points of entry and the alternating potential differences betwen them all have exactly equal periods but have differences' in phase and may have differences in wave form. This term is ordinarily applied to symmetrical systems.

ponton (engr) In military usage, a float, often in the form of a boat, used to provide buoyancy for the superstructure and imposed loads of a float bridge.

pontoon (aer) Obsolete as applied to aircraft. See float.

pontoon (ship) A portable tank used to give buoyancy

poop (ship) The structure or raised deck at the after end.

poop bulkhead (ship) A bulkhead placed at the fore end of a poop between the shelter deck and the poop deck.

poop deck (ship) The raised deck on the after part of a ship

poop deck beams (ship) The beams on which a poop deck is laid.

poop deck waterway (ship) The space between the gunwale and the gutter angle bars on a poop

poop ladder (ship) A ladder leading from a sheltered deck to a poop deck.

poop rail (ship) A rail surrounding the poop deck.

poplin (text) A fine corded fabric, made with fine warp and coarse filling. May be made of cotton. Many grades. Used for shirts, suits, dresses, trimmings, and hangings.

poppet (aut) A spring loaded ball engaging a notch. A ball latch.

poppet valve (aut). A mechanically-operated engine valve governing inlet and exhaust. It consists of a head, a stem, a spring, and a valve face which fits into a valve seat. The valve is opened by the action of a cam and closed by a strong spring.

pop test (paper). A test of the bursting strength of paper while under pressure, usually made with a Mullen tester. It is often called the Mullen test.

porch (bldg). An ornamental entrance way.

porosity (weld). The presence of gas pockets or inclusions.

porpoising (aer). An undulatory movement of a seaplane consisting of a combination of a vertical oscillation and an oscillation about its transverse axis, which occurs at certain stages of planing.

port (ship). An opening in a vessel's side, in a bulwark, etc., used for various purposes.

port brow (ship). A ledge protruding above a port to keep drip from entering.

port hole (ship). An opening in the ship's shell plating.

port lid (ship). A shutter for closing a port hole in stormy weather.

ports (aut). Openings in a cylinder block or sleeve for intake, exhaust, water, oil, etc.

port side (ship). The left-hand side of the ship looking forward toward the bow or stem.

port tack (ship). When sailing with the wind [illegible] the port [illegible].

portrait lights (phot). [illegible]

[illegible]

positive (phot). Opposite of a negative, the true picture.

positive-driven type supercharger (aer). A supercharger driven at a fixed speed ratio from the engine shaft by gears or other positive means.

positive electricity. The kind of electricity which predominates in a body composed of glass after it has undergone electrification by rubbing with silk.

positive light modulation (television). Positive light modulation occurs when an increase in initial light intensity causes an increase in the transmitted power.

positive quantity (alg). Any quantity preceded by a plus sign.

positive terminal (pole). The usually accepted terminal from which the current enters the circuit.

positron (el). The natural elemental quantity of positive electricity when associated with a mass of electronic magnitude.

post (bldg). A timber set on end to support a wall, girder, or other member of the structure.

postheating (weld). Heat applied subsequently to welding or cutting operations.

post office scale. See spring balance.

[illegible]

[illegible]

[illegible]

potential. In *dynamics*, the sum of the products of all the pairs of particles of two systems (one from each system), each product divided by the distance between the pair—in the limit, a double integral, the work that would be done by a system of attracting and repelling masses in moving from situations infinitely remote from one another to their actual position. In *electrostatics*, at any point near or within an electrified body, the quantity of work necessary to bring a unit of positive electricity from an infinite distance to that point, the given distribution of electricity remaining unaltered. In *magnetostatics*, at any point in a magnetic field the quantity of work expended in bringing a positive unit magnetic pole from a fixed given distance to that point.

potential difference (el) The electric potential difference between two points is equal to the work associatetd with the transfer of unit quantity of positive electricity from one point to the other If outside energy is required to transfer unit positive quantity from a to b, b is at a higher potential, than a.

potential energy (phy). The potential energy of a body or of a system of bodies in a given configuration is the work required to bring the system from an arbitrarily chosen reference configuration to the given configuration without change in the kinetic energy of the system.

potentiometer (el) An instrument which embodies part or all of a potentiometer circuit, and by means of which the value of an electromotive force or potential difference, in one of the arms of this circuit, may be measured in terms of one or more other electromotive forces or potential differences and the constants of the potentiometer circuit when the response of a suitable detecting device has been reduced to zero or to an amount which is measurable by the detecting device.

potentiometer circuit (el) A network which is so arranged that, when two or more electromotive forces (or potential differences) are present in as many different branches, the response of a suitable detecting device in one of these branches may be made zero by a suitable adjustment of the electrical constants of the network, and which is characterized by the fact that the detecting device and the electromotive force (or potential difference) under measurement are in the same branch.

pouches (ship) Strong bulkheads placed across the hold to prevent the cargo from shifting in vessels that are laden in bulk.

pour point (aut) The lowest temperature at which fuel oil will just flow under controlled test conditions. It is an indication as to the suitability of the fuel for cold weather operation.

powder metallurgy (metal) A process of sintering pulverized metals at high temperatures in molds of specified shape. It is somewhat similar to the method used in making plastics. Employed with certain metals (e.g tungsten) which would not yield as good results if melted and cast in the usual way

powder post (lumber) A form of decay which develops very rapidly It bores into the wood and transforms it into a fine powder Since the powder post lodges initially under the bark, all bark should be removed from air-dried lumber before it is used in buildings.

powder silk (text) A spun silk fabric made for holding the explosive charge for big guns.

power (alg) A number used several times as a factor Example: the result of X^2 is the second power of X.

power (opt) The number of times an object is magnified by a microscope, expressed in diameters.

power (phy) Power is the work accomplished in a given time. It is force times the distance through which the force acts divided by the time during which the force is acting, or

work divided by time. Velocity is distance divided by time. Force times velocity is force times a distance divided by a time; therefore a force multiplied by a velocity gives power. Power is expressed in foot-pounds per second or sometimes in foot-pounds per hour. A common but unscientific unit is the horsepower which by definition is 1 horsepower = 550 foot-pounds/second or [illegible] foot-pounds/hour.

power amplification (rad.) The ratio of the power delivered by the output circuit of an amplifier containing a source of local power to the power supplied to the input circuit.

power detection (rad.). That form of detection in which the power output of the detecting device is used to supply a substantial amount of power directly to a device such as a loud speaker or recorder.

to be transferred to another source of power (q.v.)

power transmission group (auto) A group of units transmitting power from the engine (power plant) to the wheels. It consists of clutch, transmission, propeller shafts, universal joints, differentials, and driving axle shafts.

practical electrical units. The relationships between the practical units [illegible] is expressed by equations in which the proportionality factor is unity. The important equations are: $E = IR$, $Q = It$, $E = -L\,dI/dt$, $Q = CE$, $P = EI = I^2R$, $W = EIt$. The symbols in these equations are defined as follows: I is current in amperes, R is resistance in ohms, Q is quantity in coulombs, L is inductance in henrys, C is capacitance in farads, P is power in watts, W is energy in joules, t is time in seconds.

uneven, the horsepower falls off and the excessive pressures and temperatures damage the engine parts and shorten the life of the engine

preliminary matter (print) The title, preface, table of contents, etc., which come before the main text of a book, the front matter

preservative (phot) A chemical added to a developer to eliminate fog or stains, generally sodium sulphite.

press cloth (text) A strong material made of cotton, linen, glass, or other inert synthetic fiber and used for filtering

press feeder (print) A person who feeds sheets into a press. A machine performing the same operation.

press fit. See fits

pressman (print) One who operates a printing press or has charge of one. A press feeder is not usually termed a pressman unless he also makes ready and manages a press.

pressure (phy) A force, per unit area, exerted over the surface of a body Expressed as dynes per square centimeter

pressure altitude (aer) 1 The altitude corresponding to a given pressure in a standard atmosphere 2 The altitude at which the gas bags of an airship become full.

pressure altitude (air nav) The indicated pressure altitude corrected for instrumental and installation errors.

pressure flap (aer) A flap valve fitted in the outer cover or envelope of a rigid airship and arranged to permit the rapid flow of air in and out—particularly inward The purpose is to facilitate the rapid equalization of the pressure of the air in the envlope with that of the surrounding air

pressure height (aer) The altitude at which the gas cells of a rigid airship or the gas bag of a nonrigid airship are completely full of gas.

pressure-rigid airship (aer) An airship combining the principles used in both rigid and nonrigid airships to maintain shape and skin tautness.

pressure thermit welding A pressure welding process wherein the heat is obtained from the liquid product of a thermit reaction.

pressure welding A group of welding processes wherein the weld is consummated by pressure.

prick punch (mach.) A small punch with a keen point used to transfer the holes from a template to the work. See also *punches*

primary cell (el) A cell designed to produce electric current through an electrochemical reaction which is not efficiently reversible and hence the cell, when discharged, cannot be efficiently recharged by an electric current.

primary colors (phy) The so-called primary colors are red, green, and blue. The great English physicist, James Clerk-Maxwell, demonstrated almost a hundred years ago that all colors and shades of color can be duplicated by the admixture in various proportions of the light of these three colors. The principle is now applied in color photography

primary structure (stress analysis). The main framework, including fittings and attachments Any structural member, the failure of which would seriously impair the safety of the airplane, is a part of the primary structure.

primary type glider (aer) A ruggedly built glider designed for use in elementary training of student glider pilots.

primary winding (el) The winding on the input side

prime number (alg) Any number or expression which has no factors except itself and 1

print (text). A general term for printed cotton fabrics

print finishing (phot) The work which extends from the final washing of the print to its delivery in the form for which it was made.

print trimmer (phot) See trimming board.

printer. One who follows the occupation of printing either as workman or employer. Nowadays a very comprehensive term which should have some qualifying adjective, such as book printer, newspaper printer, job printer, plate printer, etc. Very insistently the term "printer" seems often to be applied to those who are merely compositors and have little or nothing to do with presswork or printing.

printing ink. A mechanical combination of linseed oil and black or colored pigment used to make visible and permanent the impression of type, engravings, etc., on paper. Printing ink is not at all like writing ink, but is more like paint, with certain qualities which are necessary for its peculiar use. It must distribute in a thin film freely and evenly, and it must work sharp and clean without spreading. It must adhere to the type easily and yet come off [illegible] and adhere to the paper.

printing processes. There are three major [illegible] letterpress, [illegible] and gravure, each of which has numerous [illegible] [illegible]

[illegible]

[illegible]

the function of which is to direct the incident light in desired directions.

private branch exchange (tp) (PBX) A telephone system, usually installed on the premises of a subscriber, having centralized switching equipment for interconnecting of the subscriber and for connecting these stations to lines to a central office.

private exchange (tp) A telephone system which serves one business organization or one individual, and is not connected to a central office.

process engraving (print). The general term applied to printing surfaces produced by chemical and mechanical means more especially the photo-mechanical processes by which zinc etchings, halftones, etc., are produced.

process film (phot) A film designed to give extreme contrasts, generally used in copying

process shot (moving pictures) A method for combining a real life foreground action with a projected picture in the background.

producer See producer gas.

producer gas. A fuel gas consisting essentially of nitrogen (53%), carbon monoxide (25%), hydrogen (13%), and hydrocarbons. Produced by blowing air and steam through a bed of incandescent coal in a furnace called a producer.

product (math). The result obtained by multiplying two numbers.

profile drag (aer) The difference between the total [illegible] drag and the [illegible]

profile [illegible] The side elevation of [illegible]

profile thickness (aer) The maximum distance between the upper and lower contours of an airfoil, measured perpendicularly to the mean line of the profile.

progressive scanning (television). A type of scanning in which scanning lines [illegible]

trace one dimension substantially parallel to the side of the frame and in which successively traced lines are adjacent.

projected plan form (aer) The contour as viewed from above.

projected propeller area (aer) Projected blade area times the number of blades.

projected propeller-blade area (aer) The projection of the propeller-blade area on a plane perpendicular to the axis of rotation of the propeller

projection lens (phot) A type of lens used in lantern slide, enlarger, or motion-picture projection.

projection lines (draw) Lines used to correlate different views of an object.

projection welding A resistance welding process wherein localization of heat between two or more surfaces or between the end of one member and surface of another is effected by projections.

projector (aer) A device for projecting a beam of a light, as a searchlight projector

promenade deck (ship) A deck above upper deck, set aside for use of first-class passengers on passenger ships.

proof (print) After types are set their correctness must be verified before they are ready to be printed. For this purpose a trial impression is taken, in order that the composition may be examined and needed corrections made. This trial impression is the printer's proof.

proof (used as a suffix) Apparatus is designated as splashproof, dustproof, etc., when so constructed, protected or treated that its successful operation is not interfered with when subjected to the specified material or condition

proofreader's marks (print) Symbols used to indicate corrections in type.

proof strain (ship) A limited test applied to anchors, chains etc., to prove the trustworthiness of the material from which they were manufactured.

proof test. A proof test of an instrument or meter is a test made to demonstrate that the device is in satisfactory condition in one or more respects.

propeller (aer-ship). Any device for propelling a craft through a fluid, such as water or air, especially a device having blades which, when mounted on a power-driven shaft, produce a thrust by their action on the fluid.

propeller arch (ship) The arched section of the hull above the propeller

propeller area (aer) Blade area times the number of blades

propeller blade area (aer) The developed area of the blade face exclusive of the boss and the root, i.e., exclusive of that portion the thrust of which is negligible in comparison with the total thrust of the blade

propeller blade flange (ship) A flange on blades that are bolted to the propeller boss.

propeller blades (ship) The flat arms that take hold on the water as the propeller turns.

propeller boss (ship) The hub to which removable blades are bolted

propeller disk area (aer) The total area swept by a propeller, i.e., the area of a circle having the same diameter as the propeller.

propeller efficiency (aer) The ratio of the thrust power to the input power of a propeller

propeller radius (aer) See tip radius.

propeller rake (aer) The mean angle which the line joining the centroids of the sections of a propeller blade makes with a plane perpendicular to the axis.

propeller root (aer) That part of the propeller blade near the hub.

propeller shaft (aut) See drive shaft.

propeller shaft (ship) The shaft to which the propeller is keyed or fastened.

propeller thrust (aero) The component of the total air force on the propeller which is parallel to the direction of advance.

propeller tipping (aero) A protective covering of the blades of a propeller near the tip.

proportion (math) An equation in each side of which is the ratio of two numbers, for [illegible] 2 is to 4 as 6 is to 12.

proportional limit (mech) Stress at which the deformation ceases to be proportional to the load as determined by [illegible]

propulsive efficiency (aero) The ratio of the product of the propeller thrust and flight speed to the actual power input into the propeller as delivered by the engine.

proximity effect (elec) The phenomenon of nonuniform current distribution over the cross section of a conductor caused by the variation of the current in a neighboring conductor.

psychrometer (phys) An instrument used to measure atmospheric humidity. It consists of two thermometers, one of which has a bulb moistened [illegible]



pull-up (aer) A maneuver, in the vertical plane, in which the airplane is forced into a short-climb, usually from approximately level flight. See *zoom*.

pulp board (paper) Stiff, thick cardboard of cheap grade, made of wood pulp rolled into sheets as distinguished from pasteboard which is formed by pasting sheets of card (middles) and paper together, used for box-making, book covers, etc.

pulsating current (el) A periodic current which is the sum of a direct current and an alternating current.

pulsation welding A spot, projection, or seam welding process wherein the welding current is interrupted one or more times without release of pressure or change of location of electrodes.

pulse (el). A wave in which the displacement at each point of the medium is an aperiodic function of the time A pulse produces at any point a single displacement subsequent to which the medium returns to a state of passive equilibrium.

pump (aut) See circulating pump.

punches (tool) Tools used to locate centers for drawing circles, to start holes for drilling, or to punch holes in metal sheets which are 24-gage or thinner The two kinds of punches generally used are solid and hollow The solid punches are classified according to the shape of their points, pin punches, taper punches, solid punches, prick punches, and center punches. Center punches are intended for starting holes to be drilled with a twist drill. Prick punches are generally used for marking centers or other locations on metal. Pin punches are used for driving out straight or tapered pins.

pure mathematics. The study and development of the principles of mathematics as such (for their own sake and possible future usefulness) rather than for their immediate usefulness. Sometimes called "abstract mathematics." Cf. "applied mathematics."

purity (of gas) (aer) The ratio of the partial pressure of the aerostatic gas in the container to the total pressure of all the contained gases.

purlin (bldg) A timber supporting several rafters at one or more points, or the roof sheeting directly

purple discoloration (phot) A purple-colored stain in a negative generally caused by high iron content in the water with which the chemicals were mixed.

push-down (aer) The opposite of pull up.

pusher airplane (aer) An airplane with the propeller or propellers aft of the main supporting surfaces

pusher propeller (aer) A propeller mounted on the rear end of the engine or propeller shaft.

push-pull microphone (rad) A microphone which makes use of two microphone elements operating 180° out of phase.

push welding See poke welding

pyro (phot) See pyrogallic acid

pyroconductivity (metal) Electrical conductivity which develops with rising temperature, and notably upon fusion, in solids that are practically non-conductive at atmospheric temperatures.

pyrogallic acid (phot) Comes in white crystalline form and is chiefly used as a developing agent. It is a poison. Also called pyro or pyrogallol.

pyrogallol (phot). See pyrogallic acid.

pyrometer (metal) An instrument for measuring high temperatures.

pyrostat. An automatic device for regulating high temperatures.

Q

quad (elec) A structural unit employed in cable consisting of four separately insulated conductors twisted together. Two kinds of quads are now in use: 1) the multiple twin quad in which the four conductors are arranged in two twisted pairs, and the two pairs twisted together; 2) the spiral quad (or spiral four) in which the four conductors are twisted about a common axis.

quad (typog) See quads.

quadded cable (elec) A cable in which at least some of the conductors are arranged in the form of quads.

quadrant (nav) A nautical instrument, the arc of which is a finely graduated [illegible]

[illegible]

[illegible]

[illegible]

quadrilateral (geom) A polygon of four sides.

quadruple riveting (ship) The riveting together of parts by four rows of rivets.

quads (print) Cast metal blanks, wider than the three-to-em space, used to fill the larger white spaces in lines, such as to indent the first line and to fill out the last line of a paragraph.

qualified welder A welder who, under specified conditions, can consistently make welds having specified properties.

qualitative analysis (chem) A branch of analytical chemistry concerned with determining the constituents of a substance but not their respective percentages.

quanta (phys) See quantum theory.

quantitative analysis (chem) A branch of analytical chemistry concerned with determining both the constituents of a substance and their respective percentages.

quantum theory (phys) This theory states that radiant energy is given off by radiators as though the matter were composed of small particles of units called "quanta."

quarter-binding (bookb) Leather or cloth back with paper board sides.

quarter bronze (met) See bronze [illegible]

quarter-bound (bookb) A book with the back made of one material and the sides [illegible]

quarter man (ship) An officer having charge of a subdivision of workmen in a navy yard

quartermaster (ship) An able seaman, almost exclusively employed for steering a vessel, on large steamers, four to six men so rated relieve each other every hour or two A petty officer in the navy

quarter-phase (or two-phase) circuit. A combination of circuits energized by alternating electromotive forces which differ in phase by a quarter of a cycle, i.e. 90 degrees In practice the phases may vary several degrees from the specified angle.

quarters (ship) Living space for the crew

quarto (book) A sheet of paper (approximately 18 x 24 inches, or the size known as medium) folded twice, making four leaves, or eight pages

quartz lenses (phot). Those made of quartz instead of optical glass in order to gain speed by the transparency of quartz for all the ultraviolet rays some of which cannot pass through glass

quassia (bot) Bitterwood, bitterash, wood of *picrena excelsa,* a tree of Jamaica.

quaternary compound (chem) A combination of four different elements.

quench (mach) To harden steel by plunging it red hot into water or oil.

quick break (el) A switch or circuit breaker is quick-break when it has a high contact-opening speed independent of the operator

quicken (ship) To shorten the radius of a curve, as to quicken a sheer is to make it more pronounced.

quicklime (chem) Calcined limestone or burnt lime, used in making mortar and as a flux in metal smelting

quick-make (el) A switch or circuit breaker is quick-make when it has a high contact-closing speed indpendent of the operator

quill drive (el) A form of drive in which the motor is geared to a hollow cylindrical sleeve or quill, or the armature is directly mounted on a quill, in either case the quill being mounted substantially concentrically with the driving axle and flexibly connected to the driving wheels.

quinol (phot) See hydroquinone

quire (paper) Twenty-four sheets of paper, or one-twentieth of a ream of 480 sheets, if the ream consists of 500 sheets, as it often does now, the quire is twenty-five sheets

quoin key (print) The T shaped piece of iron used to operate metal quoins in locking up forms.

quoins (print) Small wedges used for locking up forms, made of hard wood and also of iron, in several varieties.

quotient (math) The number of times a divisor will go into a dividend. It is the result of a process of division.

radiation resistance (on an antenna) The quotient of the power radiated by an antenna by the square of the effective antenna current measured at the point where the power is supplied to the antenna.

radical (alg) Any indicated root of a number

radical (chem) That part of a molecule which enters into a chemical reaction.

radical sign (math) The symbol for extracting the square root. It is usually combined with a horizontal line called the vinculum. Example $\sqrt{\quad}$

radioactive. Capable of emitting spontaneously rays consisting (at least in part) of material particles traveling at high velocities.

RADIO SYMBOLS

Battery
Aerial
Ground
Fuse
A.C. Generator
D.C. Generator
Meters
Voltmeter or
Ammeter or
Wattmeter
Key
Jacks frame
Switches
Relay

VACUUM TUBES
Diode (two elements) Filament type
plate
filament
Diode (cathode type)
cathode heater
Triode (three elements) Filament type
grid
Triode (cathode type)
Tetrode (four elements)
No. 2 grid
No. 1 grid
Pentode (five elements)
No. 3 grid
Pentode No. 3 grid, suppressor, connected internally to cathode.
In some diagrams radio tube symbols show a rectangle for plate and a wavy line for the grid.
Cathode may also be shown this way.

radio altimeter (air nav) An altimeter utilizing radio waves.

radio beacon. A radio transmitting station in a fixed geographic location which emits a distinctive or characteristic signal for enabling mobile stations to determine bearings or courses.

radio channel. A band of frequencies of a width sufficient to permit its use for radio communication. The width of a channel depends upon the type of transmission.

radio compass. A direction finder used for navigational purposes.

radio direction finder (R.D.F.) (air nav) A device for indicating the direction of a transmitting station. The term "radio compass" has been incorrectly used for this device

radio frequency A frequency usually higher than those corresponding to normally audible sound waves and lower than those corresponding to heat and light waves The present practicable limits of radio frequency are roughly 10 kilocycles per second to 2,000 megacycles per second.

radio-frequency alternator (rad) A rotating type generator for producing radio-frequency power

radiograph. A shadow picture produced by passing X-rays or gamma rays through an object and recording the variations in the intensity of the emergent rays on a suitable sensitized film.

radiography (weld) The use of radiant energy in the form of X-rays or gamma rays for the non destructive examination of opaque objects, which yield a graphical record of their soundness on sensitized film.

radio locator (rad). See radar.

radiology (el) That branch of science which relates to Roentgen rays and radium rays.

radio loop (aer) A specified number of turns of wire located in the wings or wound around the fuselage of an airplane Small portable loops on a rectangular frame are also used.

radio-marker beacon (aer). See radio-directive devices.

radio mast (aer) A mast attached to an aircraft which serves as part of the radio-antenna structure

MATERIALS USED IN RADIO TUBES

[illegible] CARBONATE · NICKEL · SILVER OXIDE

[illegible] · RESIN (SYNTHETIC) · ETHYL ALCOHOL
LEAD ACETATE · [illegible] GREEN · GLYCERINE · ZINC CHLORIDE · [illegible]

MARBLE DUST · [illegible] · STRONTIUM NITRATE · LEAD OXIDE · ZINC OXIDE

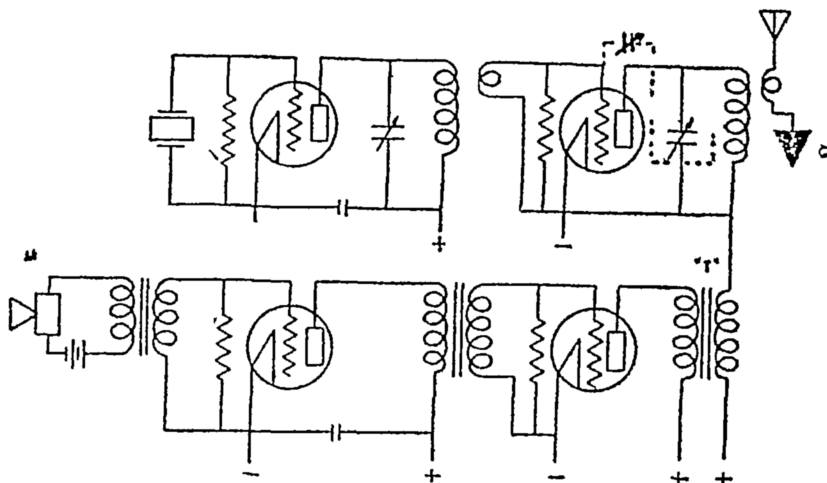
[illegible] METAL · [illegible] · PORCELAIN · PETROLEUM JELLY · ZINC

BARIUM CARBONATE
ARSENIC TRIOXIDE
STRONTIUM CARBONATE

CALCIUM CARBONATE
AMMONIUM CHLORIDE
POTASSIUM CARBONATE

[illegible]
MOLYBDENUM
ALUMINUM
BORAX
BARIUM
COPPER
CARBON
[illegible]
[illegible]
[illegible]
COBALT
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

BAKELITE
PHOSPHORUS
SILICON
SHELLAC
TUNGSTEN
TITANIUM
SILICA
GLASS
MAGNESIA
PLATINUM
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]



Radiotelephone transmitter circuit.

(Courtesy Civil Aeronautics Administration)

radiometallography (metal). The radiography of metals

radio-meteorograph (met) An instrument used to measure pressure, temperature, and humidity above the earth, which transmits the measurement immediately by means of a small transmitter

radio navigation (aer) The method of conducting an aircraft from one point to another by radio aids, such as the radio beacon, radio direction finder, or radioed bearings

radiopaque (phy) Opaque to the Roentgen ray; not permitting the passage of radiant energy

radio range beacon. A radio beacon which transmits directed waves by means of which deviations from a given course may be observed.

radio shielding (aer-el) *Radio shielding* on an aircraft is the metallic covering over all electric wiring and ignition apparatus, which covering is grounded at frequent intervals to the frame of the aircraft for the purpose of eliminating electric interference with aircraft radio communication

radio transmission The transmission at radio frequencies of signals by means of radiated electromagnetic waves

radius of action (air nav). The distance an aircraft can fly before returning to a base, with a designated margin of fuel and oil.

radius rods (aut). Rods attached to axles to prevent misalinement or twisting

rag cutter (paper). In papermaking, a special machine having revolving blades and sharp prongs, which tear and chop the rags into small pieces of uniform size

rag paper Made from linen or cotton rags, the better classes of paper are made from linen rags

rag pulp (paper) Pulp consisting principally of cotton rags, shirt clippings, etc., used for making the best grades of bond, ledger, linen, and writing papers.

rail [illegible] The horizontal members of a [illegible] or panel work.

railing [illegible] A guard made of flat pieces of wood or [illegible] bars or rods, joined and [illegible] to the upper edge of the [illegible] or fitted upon the [illegible] surrounding an upper deck, [illegible], or [illegible].

rail bond [illegible] An electric conductor [illegible] between abutting lengths of rail. Bonds may be applied [illegible] welding, brazing, or by mechanical means.

raised crossing deck [illegible] A structure [illegible]

[illegible]

rake [illegible] The [illegible] of a building [illegible]

[illegible] from both the single and double cuts of files in that the teeth are individually cut and disconnected from each other. The rasp cut is a series of individual teeth produced by a sharp, narrow, punch-like cutting chisel. It is an extremely rough cut and is used principally on wood, leather, hoofs, aluminum, lead and other such soft substances for the rapid removal of material.

rasp cut. A file tooth arrangement under which teeth are individually formed, one by one, by means of a narrow, punch-like chisel.

ratchet [illegible]. A mechanism consisting of a gear with fine gear teeth engaged by a pawl which either moves the gear forward or holds it against backward movement.

ratchet [illegible] A standard attachment on the

as a fraction or by the symbol between the numbers The ratio of two specific quantities has meaning only if they are of the same kind.

rational number (alg) Any positive and negative integers and fractions.

ratio of a transformer (el) The turn ratio of the transformer, unless otherwise specified.

rayon (text) A generic term for filaments made from various solutions of modified cellulose by pressing or drawing the cellulose solution through an orifice and solidifying it in the form of a filament. Rayon is manufactured in two forms—continuous filament yarn and staple fibers of spinnable length.

rayon staple (text) Rayon fibers of spinnable length, manufactured directly or by cutting continuous filaments Rayon staple does not include cut rayon waste.

reach (nav) A course that can be made good sailing off the wind. A straight run between bends in a river or canal.

reactance (el) The reactance of a portion of a circuit for a sinusoidal current and potential difference of the same frequency is the product of the sine of the angular phase difference between the current and potential difference times the ratio of the effective potential difference to the effective current, there being no source of power in the portion of the circuit under consideration. The reactance of a circuit is different for each component of an alternating current.

reactor (el) A device used for introducing reactance into a circuit for purposes such as motor starting, paralleling transformers and control of current.

reagent (chem) Any substance which, when added to another, causes a chemical reaction.

ream (paper) There is much confusion in the paper and printing industries because of the variation in the number of sheets of paper which make a ream. At present a ream may be from 480 to 516 sheets, usually 500 sheets according to the class of paper By action of the Paper Conference Board (effective Feb. 1, 1927) and approved by the United Typothetae of America, the ream as a basis of count and weight is obsolete, instead 1,000 sheets becomes the standard basis.

reamer (tool) A tool for enlarging drilled holes to an exact size while finishing them round, straight, and smooth. The two types of reamers are straight reamers and taper reamers, both very useful to the automotive mechanic whenever considerable accuracy of size, roundness, and smoothness of finish are required of the hole.

reaming (ship) Using a reamer to make rivet holes fair and smooth on the inside.

receptacle (el) A contact device installed at an outlet for the connection of a portable lamp or appliance by means of a plug and flexible cord.

receptacle outlet (el). An outlet intended to be equipped with one or more receptacles, not of the screw-shell type; or to be provided with one or more points of attachment within one foot intended to receive attachment-plug caps.

recess bulkhead (ship). A bulkhead of any recessed portion of a hold or compartment.

recess of tunnel (ship). The elevated and extended portion of a tunnel. At the after end such an enlargement of tunnel is called "stuffing box recess," while at the forward end it is known as "thrust recess."

reciprocating motion. Back and forth motion, as that of a piston in a cylinder.

reciprocating-type supercharger (aer) A positive-displacement reciprocating pump in which the air or mixture is compressed by a piston working in a cylinder

reclaimed wool (text) Wool fiber taken or reclaimed from manufactured materials. Commonly called "shoddy"

recording instrument (el) An instrument which makes a graphic record of the

FLOW DIAGRAM OF PRINCIPAL [illegible] PROCESSES

value of a quantity as a function of time. Also called recorder and graphic instrument.

rectangular coordinates (surv) Distances from an assumed or fixed point called the "origin" to any other point within the boundaries of any one particular rectangular coordinate system. These distances are measured parallel to two lines intersecting at right angles at the "origin", one line running south-north and the other line west-east. The location of any point in a system of rectangular coordinates is always expressed by two values. Latitude and Departure.

rectifier (el) A device which converts alternating current into unidirectional current by virtue of a characteristic permitting appreciable flow of current in only one direction.

rectifier transformer (el). A transformer the secondary of which supplies energy to the main anodes of the rectifier

rectilinear lens (phot) One which does not distort or show curvature of straight lines in the image.

re-cut. A worn-out file which has been recut and re-hardened after annealing (softening) and grinding off the old teeth. (Similar to "regrooving" as applied to automobile tires)

red birch (lumber) The woor is light brown in color Used in furniture making and in turned work.

red cedar (*thuja plicata*) A very durable wood, ranging in color from white to rose-red. Used for cedar chests, closets, and for pencils. Wt. 22 lbs. per cu. ft. (air-dried) Maximum crushing strength 6,320 lbs. per sq in. Shearing strength parallel to grain 920 lbs per sq in.

redgum (lumber), A hard, heavy wood used extensively for furniture and in building construction.

red maple (*acer rubrum*) A valuable wood used extensively for turning, cabinet work, and flooring Wt. 37 lbs. per cu. ft. (air dried) Maximum crushing strength 7,330 lbs. per sq in. Shearing strength parallel to grain 1,970 lbs. per sq. in.

red mulberry (lumber) A durable wood used in boat building.

red oak (*quercus rubra*) A commercially valuable close-grained wood, used for heavy beams and general construction purposes Wt. 44 lbs per cu. ft. (air dried) Maximum crushing strength 7,370 lbs per sq in. Shearing strength parallel to grain 1,760 lbs. per sq in.

red ochre (chem) See ochre.

redox (chem) The phenomenon of mutual reduction and oxidation, oxidation-reduction (abbr)

red pine (*pinus resinosa*) Sometimes called Norway pine. A close-grained, durable wood reddish brown in color Used for spars, piling, and sills. Wt. 34 lbs per cu. ft. (air-dried) Maximum crushing strength 7,080 lbs per sq in. Shearing strength parallel to grain 1,260 lbs. per sq in.

reducer (phot) A chemical solution for decreasing contrast or density

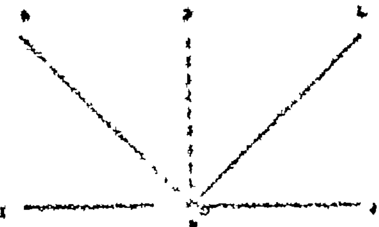
reducing (phot). The opposite of enlarging Generally done with a copying or reducing camera.

reducing flame (weld). A gas flame wherein the portion used has a reducing effect.

reduction (chem) The gain, by the substance being reduced, of one or more electrons Invariably accompanied by oxidation of some other member of the system under consideration. The term covers also the addition of hydrogen atoms and the loss of oxygen atoms.

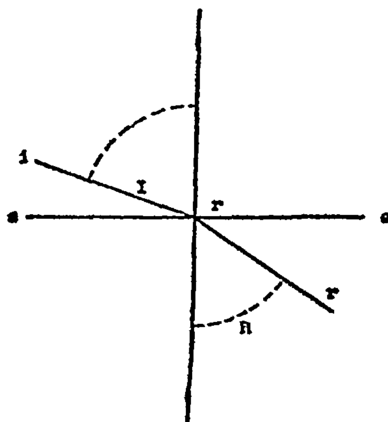
reduction gears (ship) The gears that reduce turbine speed to propeller speed. They constitute an important part of a turbine installation, and may be located forward or aft of the turbines. The reduction is generally made in two stages.

reduction of area (StM) In a member ruptured by tension, a reduction in area of the cross section at the point of rupture will be observed. This reduction in area is a characteristic of tension failures. The percentage of reduction in area



media (the *angles of incidence* and *refraction* are the angles which the incident and refracted ray make, respectively, with the perpendicular to the surface) If the first medium is air, this ratio is called the *index of refraction* or the *refractive index* of the second medium.

PRINCIPLE OF REFRACTION



i = incident ray
r = refracted ray
I = angle of incidence
R = angle of refraction
S = refracting surface

refractory. A material which resists the action of heat, such as fireclay, silica. Used as furnace linings.

refrigerant. A liquid of low boiling temperature, e.g., brine, methyl chloride solution, etc.

refrigerating effect (refrigeration) The ability of a refrigerant to absorb Btu. The amount of heat a pound of refrigerant can absorb in vaporizing is known as the heat of vaporization per pound.

regeneration (rad) The process by which a part of the power in the output circuit of an amplifying device reacts upon the input circuit in such a manner as to reinforce the initial power, thereby increasing the amplification. This is sometimes called "feed back" or "reaction."

regenerative furnace (metal) A special type of reverberatory furnace in which the air and fuel are pre-heated in special chambers called regenerators. These furnaces generally use gas or liquid fuel. The open hearth furnace and Siemens furnace are examples of regenerative furnaces.

registered breadth (ship). The breadth measured amidships at a vessel's greatest breath to the outside plating

regulating transformer (el) A transformer having one or more windings excited from the system circuit or a separate source and one or more windings connected in series with the system circuit for adjusting the voltage or the phase relation or both in steps, usually without interrupting the load.

regulator (el) A device which functions to maintain a designated characteristic at a predetermined value, or to vary it according to a predetermined plan.

reguline (metal) A descriptive word for electro-deposited metal which is firm and metallic in physical characteristics as contrasted with loose, spongy, dull or non-metallic appearing surfaces.

reinforced shell (aer) See monocoque fuselage.

reinforcement of weld. Weld metal on the face of a weld, in excess of that required for the size of weld specified.

related numbers (math) Any numbers whose relation to each other is expressed by a formula.

relative bearing (air nav). The direction of an object expressed as an angle measured clockwise from the heading of an aircraft.

relative efficiency of biplane wings (aer) The ratio of the normal load per square foot on the upper wing to that on the lower

relative humidity (met). A ratio of the actual water vapor present to the total containable in a parcel of air. It is a measure of the degree of saturation. Usually designated by *f*

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

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[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

resistance thermometer (el) An instrument for measuring temperature, which depends for its operation upon the variation of electric resistance with temperature A resistance thermometer consists of a conductor with some metal having a large change of resistance with temperature, the conductor being of such form that it can be placed in the region where the temperature is to be measured, and that its resistance can be measured independently of the resistance of the leads.

resistance welder. A resistance welding machine.

resistance welding A pressure welding process wherein the welding heat is obtained by passing an electric current between the contact areas to be welded.

resistant (used as a suffix) Apparatus is designated as moisture-resistant, fume-resistant, etc., when so constructed, protected or treated that it will not be injured readily when subjected to the specified material or condition.

resistive coupling (rad) The association of one circuit with another by means of mutual resistance.

resistor (el). A device, the primary purpose of which is to introduce resistance into an electric circuit.

resistor core (el). The resistor core of a current-limiting resistor is the insulating support on which the resistor element is wound.

resistor element (el) The resistor element of a current-limiting resistor is the material possessing the property of electric resistance.

resistor housing (el) The resistor housing of a current-limiting resistor is an enclosing member which surrounds the resistor element and the core.

resolving power (opt). In a microscope the resolving power is the number of lines per millimeter which can be clearly separated by the lenses.

resonance (in an electric circuit). Resonance may exist in an electric circuit possessing inductance resistance and capacitance between the quantity of electricity which oscillates and a periodically applied electromotive force which sustains the oscillations Any one of the three kinds of resonance, viz., amplitude resonance, period resonance, or phase resonance, may exist depending on the constants of the circuit.

resonance (phy) Resonance exists between one coordinate of a system which is executing oscillations or vibrations and a periodic agency which maintains the oscillations or vibrations when a small amplitude of the periodic agency produces in the system a relatively large amplitude of oscillations or vibration.

resonator (el) An apparatus or system in which some physical quantity is capable of being put into a state of oscillation by oscillations in another system.

restoring moment (aer) See righting moment

restrainer (phot). A compound or solution that will check or hold back the action of the developer Examples: potassium bromide, potassium iodide, sodium chloride.

reticulation (phot). A negative defect produced by sudden swelling or contracting of the film, giving it a wrinkled, leather-like appearance It is generally caused by extremes of temperature when transferring film from cool solutions to warm air

retouching (phot) The removal or softening of defects in a negative by the application of pencil lines or color.

retort. A vessel in which substances are subjected to distillation or decomposition by heat. A retort is distinguished from a still in that it is more often used for the treatment of solid or semi-solid substances.

retractable landing gear (aer). A type of landing gear which may be withdrawn into the body or wings of an airplane while it is in flight in order to reduce the parasite drag

[illegible]

[illegible] (...) An [illegible] is stamped that [illegible] may be charged without [illegible] which it may be [illegible]

[illegible] Trar [illegible] [illegible] to the [illegible]

[illegible] (...) The [illegible] of a [illegible]

[illegible]

rifflers. Fine-point and vari-shaped files used by die sinkers and silversmiths.

rig (aer) (aerostat) To attach and adjust the car, rudders, valves, controls, etc., of an airship, i.e., to erect. (airplane) To assemble, adjust, and aline the parts of an airplane.

rigger (ship) One whose occupation is to rig or unrig vessels, take up or down the yards, etc.

rigging (ship). Manila and wire ropes, lashings, etc., used to support booms, masts, spars, etc. Also handling and placing heavy weights and machinery Rigging involves the technique of handling manila and wire rope and chains in various block and tackle combinations to raise and move heavy loads.

right-hand engine (aer) An engine whose propeller shaft, to an observer facing the propeller from the engine end of the shaft, rotates in a clockwise direction.

righting moment (aer) A moment that tends to restore an aircraft to its previous altitude after any small rotational displacement. Also called "restoring moment."

rigid airship (aer) An airship whose form is maintained by a rigid structure.

rigid motion (phy) Moving a configuration into another position, but making no change in its shape or size, a rotational transformation followed by a translation, or the two taken in reverse order or simultaneously Superposition of figures in plane geometry is a "rigid motion."

rigid steel conduit (el) A raceway specially constructed for the purpose of pulling in or withdrawing of wires or of cables after the conduit is in place, and made of mild steel pipe of standard weight and thickness permitting cutting standard threads that have been cleaned of scale and rust, and having enamel and/or metallic corrosion-resistant coatings.

rime ice (met) Partially or totally opaque and granular ice deposited by cloud or raindrops when their temperature is well below freezing Rime is a very common aircraft icing hazard.

ring (tp) The ring of a plug is the ring-shaped contacting part of the plug immediately back of the tip

ring cowling (aer). A ring-shaped cowling placed around a radial air-cooled engine to reduce its drag and improve cooling

ring gage (mach) A gage used in production work to check inside and outside dimensions for size and to see that finished parts are within the manufacturing tolerance. The ring gage is generally a strip of metal having holes which slip over a round part to be gaged. There are two such holes labeled "go" and "no go" respectively

rinsing bath (phot) A water bath used to rinse the print or negative after development so as to free it from the alkali of the developer, thus avoiding neutralization of the subsequent acid fixing bath.

rip cord (aer) 1. The rope running from the rip panel to the car or basket, the pulling of which tears off or rips the panel and causes immediate deflation of a balloon or a nonrigid airship. 2. The cord which when pulled releases a parachute from its container

rip panel (aer) A strip of fabric, inserted or fitted in the upper part of the envelope of a balloon or semirigid or nonrigid airship, which is torn or ripped open when immediate deflation is desired.

ripple current (el) The alternating-current component of a pulsating current when this component is small relative to the direct-current component.

ripple filter (tp). A low-pass filter designed to reduce the ripple current, while freely passing the direct current from a rectifier or generator

ripple quantity (el) The alternating component of a pulsating quantity when this component is small relative to the continuous component.

ripsaw (carp) A saw used to cut wood along the grain. Similar in construction

[illegible]

rear deck accommodates luggage equipment or luggage. The top is of weather-proof fabric and may be folded. Equipment includes removable side curtains, and provision is usually made for folding and [illegible]

robot pilot (aer.) See automatic pilot.

rocker arm (aut.). A lever operated by the pushrod and in turn operating the valve.

rock wool (insulation). A fibrous mass obtained from [illegible]. It is listed as the most efficient fireproof insulator known. [illegible]

[illegible]

ilar to light, having wave lengths of the order of a thousandth to a millionth of those of light in the visible spectrum (10^{-7} to 10^{-10} cm) In practice they are usually generated by allowing a stream of high-speed electrons to impinge on a metal target. The term "Roentgen rays" is preferred by medical authorities, but "x rays" is in more general use by physicists

"Roger" (rad). A term used by aircraft radio operators to indicate receipt of a message Roger is the word standing for R (received) in the phonetic alphabet used to facilitate comprehension.

roll (aer) 1. A maneuver in which a complete revolution about the longitudinal axis is made, the horizontal direction of flight being approximately maintained. See also aileron roll, outside roll, snap roll. 2. An angular displacement about an axis parallel to the longitudinal axis of an aircraft.

roller (metal) One who operates rollers in a rolling mill.

roller (print) A metal rod or core covered with an elastic composition used to spread ink on the form or other printing surface.

roller bearings (aut) Consist of steel rollers between two case-hardened rings called the inner race and outer race.

roller chocks (ship) Chocks with a short vertical roller fixed to ease a line passing through.

rolling (aer) Angular motion about the longitudinal axis of an aircraft.

roll welding See forge welding

Roman numerals. A system of writing integers, used by the Romans, in which I denotes 1, V, 5, X, 10, L, 50, C, 100; D, 500, M, 1000 All integers are then written using the following rules 1. when a letter is repeated or immediately followed by a letter of lesser value, the values are added. 2. when a letter is immediately followed by a letter of greater value, the smaller is subtracted from the larger. The integers from 1 to 10 are written I, II, III, IV, V, VI, VII, VIII, IX, X. The tens are written X, XX, XXX, XL, L, LX, LXX, LXXX, XC, C. Hundreds are written C, CC, CCC, CD, D, DC, DCC, DCCC, CM, M.

Roman type. The common form of letter face such as is used for the text of this book, it is the kind of letter preferred for books and newspapers by English-speaking people and by the Latin peoples

roofing (bldg) The material put on a roof to make it windproof and waterproof

root (mach) The bottom surface joining the sides of two adjacent threads.

root edge (weld) The edge of the part to be welded which is adjacent to the root.

root face (weld) The portion of the prepared edge of a part to be joined by a groove weld, which has not been beveled or grooved.

root of weld. The point at the bottom of the weld.

root opening (weld) The separation at the root between parts to be joined by a groove weld.

root radius (weld) The radius near the root portion of the prepared edge of a part to be joined by a U- or J-groove weld.

Roots-type supercharger (aer) A positive-displacement rotary blower consisting of two double-lobed impellers turning in opposite directions on parallel shafts within a housing, the impellers rolling together except for a small clearance, meanwhile alternately trapping incoming air or mixture in the ends of the housing and sweeping it through to the outlet.

rosette (arch) An ornament or form having some resemblance to a rose, from the center of which several petal like parts radiate

rosette (el) An enclosure of porcelain or other insulating material, fitted with terminals and intended for connecting the flexible cord carrying a pendant to the permanent wiring

[illegible] The particular ... of the ... which is ... of the ... [illegible]

[illegible] A compound formed by ... with ... and used for ... [illegible]

[illegible] circular rotary ... [illegible] power ... [illegible]

[illegible] engine (aer) An engine in which ... revolve about a fixed ... [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

rotogravure (print) An intaglio printing process for rotary printing presses, much used by newspapers and magazines, and also in printing flat sheets for various classes of commercial work.

rotor (aer) The complete rotating portion of a rotary wing system.

rotor (el). The rotating member of a machine.

rotor plane (aer) A form of aircraft whose support in the air is chiefly derived from the vertical component of the forces produced by rotating airfoils.

rottenstone (min) A porous ... rock which is found in the natural state. Used as an abrasive and ... [illegible]

rough air (aer) A state of air ... by vertical currents which, when ... [illegible]

round in (naut) To haul in, as a rope in the ... [illegible]

roving (text) A loose assemblage of fibers ... [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

rudder (ship) A swinging vane, built up of casting and plates, hung to the stern post of a ship, by which the ship is steered.

rudder angle (aer) The acute angle between the rudder and the plane of symmetry of the aircraft. It is positive when the trailing edge has moved to the left with reference to the normal position of the pilot.

rudder arm (ship) L-shaped casting flanged to rudder stock forming an arm to control the rudder

rudder bar (aer) The foot bar by means of which the control cables leading to the rudder are operated.

rudder braces (nav) Strips of metal secured to the rudder, the forward ends of which fit over the rudder hanger on the stern post, thus securing the rudder and forming a pivot upon which the rudder swings.

rudder flange (ship) The flange which ties the main part of the rudder to the rudder trunk.

rudder hanger (ship) A vertical strip of metal, secured to the sternpost, forming the traveler upon which the rudder races are secured.

rudder pedals (aer) The foot pedals by means of which the controls leading to the rudder are operated

rudder post (ship). That portion of the rudder casting bearing the gudgeon eyes or "hinge ears" and rudder flange.

rudder stock (ship) See rudder post.

rudder trunk tube (ship) A cylinder made up of plates which enclose the rudder trunk or stock.

Ruhmkorff coil (el) See induction coil.

ruling pen (draw) A pen consisting of steel blades attached to a handle, and a thumbscrew for adjusting the distance between the points (nibs) of the blades to obtain the desired width of line. The ruling pen is used for inking straight lines and irregular curves.

run (bldg) The length of the horizontal projection of a piece such as a rafter when in position.

run (nav) A course that can be made good sailing before the wind

run (ship) The narrowing of a vessel's after bottom.

running before the wind (nav) Sailing free and with the wind abaft the beam.

running block (rigging) A running block is attached to the object to be moved, as distinguished from a standing block which is fixed to some permanent object.

running end (rigging). The free end of a rope.

running gear (aut) That part of an automotive vehicle consisting of the axles, wheels, springs, and chassis frame.

running light (aer). See position light.

running rigging (nav) Those ropes which reeve or lead through blocks or fairleads, such as halliards, sheets, etc., by which the sails are controlled

run-of-river station (el) A hydroelectric generating station which utilizes the stream flow without storage.

runway (aer) An artificial landing strip permitting the landing and take-off of airplanes under all weather conditions

runway floodlight system (aer) A landing-area floodlight system so operated that the runway to be used lies within a narrow floodlighted area.

runway light (aer) See contact light.

rush print (moving pictures) A print that is developed immediately so that it can be viewed by the director and his staff, and the scene retaken if necessary

Russia leather (book) Used for bookbindings. The genuine leather is made in Russia and is commonly brownish-red in color, although it is sometimes made in black, dark blue, and green. An imitation of this, known as American russia, or imitation russia, is made of cowhide, a thick strong leather with a

S

saddle board (bldg) The finish of the ridge of a pitch-roof house. Sometimes called "comb board."

saddle point (met) A small area on a weather map between two centers of low and two centers of high atmospheric pressure.

saddle-stitch (book) To bind a pamphlet by sewing or wiring it through the middle, when the sheets are folded into each other quirewise. When the folded sheets or sections of a pamphlet are placed side by side, they are *side stitched.*

S. A. E. Abbreviation *for* Society of Automotive Engineers

safe edge (or side) Used to denote that a file has one or more of its edges or sides smooth or uncut, so that it may be presented to the work without injury to that portion or surface which does not require filing

safe light (phot) A colored light used in the darkroom to permit the photographer to see his way about. A safe light should transmit light of a color to which the eye is most sensitive and the emulsion least sensitive

safety film (phot) See **acetate film.**

safety glass. See **laminated safety glass.**

safety loop (aer) A loop formed in a rip cord of an aerostat and attached to a securing patch by a breakable cord or a spring clip

sagged (ship) When from some cause a vessel's form is so altered that the ends of the keel are much above the level of its midship portion, it is said to be "sagged."

sailcloth (text) See **duck.**

sailplane (aer) A performance-type glider

sail tracks (ship) A device fitted up the mast on the after side in which slides, attached to the sail, travel in hoisting, used in lieu of mast loops.

sal ammoniac (chem) Ammonium chloride Used as a flux in soldering

salt (chem) The common name for sodium chloride. In chemistry, any compound produced when all or part of the acid hydrogen of an acid is replaced by an electropositive radical or a metal.

salting out (chem). The addition of a solid salt, or a concentrated solution of a salt to a solution or a colloid, causing the solute (liquid or solid) or the disperse phase to separate out.

sandbag line (aer) A rope extending along the line of suspension ropes or bridles of a kite balloon to which are hooked the sandbags used in mooring the balloon. The purpose is to prevent wear on the suspension cordage.

sandbag loop (aer) A system of cordage loops on the envelope of a balloon for suspending sandbags

sandpaper (carp). An abrasive made of heavy paper with sand glued to one side. It is used to smooth or finish rough surfaces of lumber Sandpaper comes in sheets 8½ by 10½ inches, and

[illegible]

[illegible]

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aids in measuring various quantities. Drawing to scale means making a copy of a drawing with all distances in the same ratio to the corresponding distances in the original, making a copy of a drawing of something with all distances multiplied by a constant factor, usually a fraction. E g, an architect drawing the plan of a house lets feet in the house be denoted by inches, or fractions of an inch in his drawing 2. A ruler having marked on it various scales.

scale (metal) The coating of oxide which forms on the surface of heated metal.

scale effect (aer) The change in any force coefficient, such as the drag coefficient, due to a change in the value of the Reynolds Number

scanning (television) The process of successively analyzing, according to a predetermined method, the light values of picture elements constituting the total picture area.

scanning line (television) A single continuous narrow strip which is determined by the process of scanning

scantling (bldg). Lumber with a cross section ranging from 2" x 4" to 4" x 4"

scarf (ship) See scarph.

scarfed joint (carp) A timber spliced by cutting various shapes of shoulders, or jogs, which fit each other

scarfing (carp) A joint between two pieces of wood which allows them to be spliced lengthwise

scarph (ship) A lapped joint made by beveling off, or otherwise cutting away the sides of two plates at the ends. Also spelled "scarf"

Schreinerizing (text). A kind of calendering which produces a high luster on cotton cloth Lustrous effect is not permanent.

scleroscope (metal) An instrument for measuring the hardness of metals. It operates on the "drop test" principle, measuring the height of rebound of a small steel hammer contained in a glass chamber The hammer is allowed to drop on the metal and its rebound is calibrated with or referred to a hardness number scale.

scoop (aer) See air scoop.

scored (mach) Marred by ridges or grooves.

scoria (metal) See slag.

scotchman (nav) A piece of iron with ring attached, seized to the shrouds.

scotia (carp) A hollow molding used as a part of a cornice, and often under the nosing of a stair tread.

scraper (mach) A tool for leveling surfaces which have previously been machined and must be true. The types commonly used are flat scrapers, bearing scapers, and three-cornered scrapers. Flat scrapers should be used for removing high spots from flat surfaces only. The three-cornered scraper is used mostly for removing burrs or sharp internal edges from soft bushings, etc. Bearing scrapers, as the name indicates, are used for scraping down high spots on bearing surfaces

scraping (mach) As applied to machine shops, the process of removing an exceedingly small portion of the wearing surfaces of machinery by means of scrapers, in order to bring such surfaces to a precision fit or finish not attainable by ordinary filing means.

screen bulkhead (ship) An arrangement to prevent the cold air from striking the boilers directly

screen grid (rad). A grid placed between a control grid and an anode, and usually maintained at a fixed positive potential, for the purpose of reducing the electrostatic influence of the anode in the space between the screen grid and the cathode

screen plate (phot). A screen used in color photography, composed of a large number of small red, green, and blue filters and covered with a sensitive emulsion.

AMERICAN NATIONAL SCREW THREAD

[illegible]

American National Screw Thread Form

Courtesy, South Bend Lathe Works

[illegible]

scrieve board (ship) A large section of flooring in the mold loft on which the frame molded lines of the ship are drawn in full size.

scrub pine (lumber) See Jersey pine.

scruff (metal) The alloy of tin and iron which collects at the bottom of tinning pots.

scupper pipe (ship) Pipe connected to deck scupper to allow water to run below decks, to prevent waste water from flowing down the sides of the ship.

scuppers (ship) Openings in the shell plating just above deck plating to allow water to run overboard.

scuttle (nav) To make holes in a ship's bottom to sink her A round or square opening in the deck. A small hatch.

sea breeze (met) A shallow, mild to moderate breeze blowing from cool water onto hot land during the heat of day.

sea-level (met) The mean level of the oceans

seal weld. A weld used primarily to obtain tightness and prevent leakage.

seam (ship) The line where the edges of plates meet when joining each other

seam welding A resistance welding process wherein overlapping or tangent spot welds are made progressively

seaplane (aer) An airplane designed to rise from and alight on the water.

seaplane hull (aer). That portion of a flying boat which furnishes buoyancy when in contact with the surface of the water It contains accommodations for the crew and passengers, usually combining the functions of both float and fuselage.

seaplane tank (aer) An elongated tank filled with water through which models of seaplane floats, boat hulls, hydrovanes, etc., are towed, and the forces and moments on the model are measured.

seaplane trim (aer) The angle with the horizontal surface of the water assumed by the float or hull under given conditions.

seat cut (carp) See plate cut.

seat (of a rafter) (bldg) The horizontal cut upon the bottom end of a rafter which rests upon the top of the plate.

seat (of a valve) See valve seat.

secant (geom) A straight line cutting a circle at two points

secondary emission (el) Electron emission due directly to the impact of electrons or ions

secondary-type glider (aer). A glider designed to have better aerodynamic performance than the primary type, but rugged enough for the use of pilots with limited training

secondary winding (el) The winding on the output side.

second cut (mach) File coarseness between "bastard" and "smooth"

seconds (text) Materials containing imperfections of such nature as to affect the suitability or quality of the material.

section (book) A sheet of book pages folded ready for sewing,, it is usually identical with signature, but often two or more signatures, set one into the other, make a section.

section (bldg) A drawing showing the kind, arrangement, and proportions of the various parts of a structure. It is assumed that the structure is cut by a plane, and the section is the view gained by looking in one direction.

section (ship) A drawing representing the internal parts of a vessel as if she had been cut straight through, either longitudinally or athwartships.

sectional view (draw) This view is obtained by imagining the object cut away, as if by sawing The path of the saw is considered the cutting plane, that is, the plane upon which the cut is made. If one portion is then removed and a drawing made of the remaining portion, the lines formerly invisible are exposed to view

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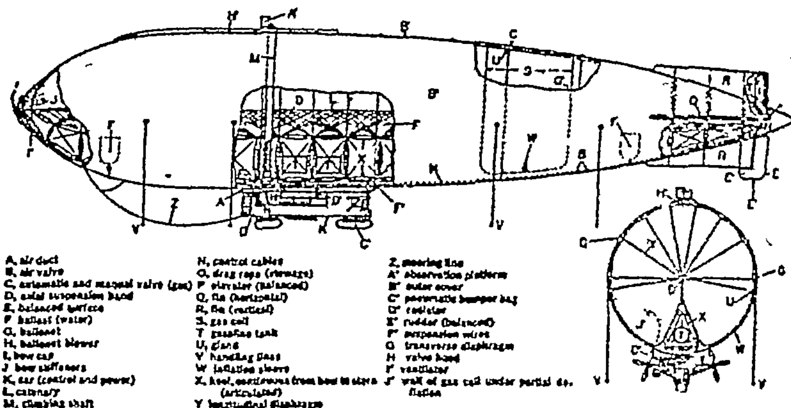
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A semirigid airship.
(Courtesy, National Advisory Committee for Aeronautics)

ing moment, and shear. It also carries tension and compression if the wheel bearings do not take thrust, and compression if they take thrust in only one direction.

semi-matte (phot). A term applied to the velvety type of surface of print papers. It is a medium grade etween matte and glossy surfaces.

semimonocoque (aer). See monocoque fuselage.

semirigid airship (aer). An airship whose shape is maintained by means of a rigid or jointed keel in conjunction with internal pressure in the gas containers and ballonets.

semitrailer (aut). A wheeled vehicle without motive power, resting on and attached to the chassis of a truck-tractor by means of a fifth-wheel arrangement. It can be detached at will from the latter.

sense finder (rad). That portion of a direction finder which permits determination of direction without 180-degree am biguity.

sensitivity (rad). The degree to which a radio receiver responds to signals of the frequency to which it is tuned.

sensitivity of a phototube (rad). The electrical current response of a phototube, with no impedance in its external circuit, to a specified amount and kind of light. It usually is expressed in terms of the current for a given radiant flux, or for a given luminous flux. In general, the sensitivity depends upon the tube voltage, flux intensity, and spectral distribution of the flux.

separation (aer). The phenomenon in which the flow past a body placed in a moving stream of fluid separates from the surface of the body.

separation point (aer). The point at which the separation of the boundary layer begins.

separator (el). A device employed in a storage battery for preventing metallic contact between the plates of opposite polarity within the cell.

sepia (cham). 1. A brown pigment prepared by treating the ink of the cuttlefish with caustic alkali, used in water colors, in drawings, and in printing. 2. An ink of this color. 3. A black and white photograph which has been chemically treated to make the blacks sepia.

sepia toning (phot). Changing a black and white enlargement to a sepia and white color by bleaching and redeveloping.

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[illegible] may be carried [illegible]

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sewing thread (text) A variety of yarn, normally plied, characterized by a combination of twisting and finishing with solid or semisolid, waxlike materials to secure a smooth, compact strand which is quite flexible and presents no loose fibers

shackle (aut) A swinging support for the end of a spring that permits it to vary in length as it deflects

shading (phot) See dodging

shadow bar (aer). A device designed to be used with a single floodlight operated as a general field floodlight, to insert a shaded region which can be so directed as to envelope a moving aircraft.

shadows (phot) The thinner or lighter portions of a negative or the darker portions of a print.

shaft (aer) See climbing shaft, gas shaft.

shaft alley (ship) A watertight passage, housing the propeller shafting from the engine room to the bulkhead at which the stern tubes commence. It provides access to the shafting and its bearings and also prevents any damage to the same from the cargo in the spaces through which it passes

shaft alley tunnel (ship) An enclosure of watertight construction, extending along the middle of the engine room bulkhead on the tank top to the stuffing box, at the after end. It contains the shaft which is elevated.

shaft log (ship) A timber connecting the keel to the after deadwood, through which the shaft passes

shaft strut (ship) A term applied to a bracket supporting the after end of the propeller shaft, and to that supporting the propeller in twin or multiple screwed vessels having propeller shafts fitted off from the center line

shagbark hickory (*hicoria ovata*) Yields a hard, heavy and tough wood, useful in making tool handles, wooden frames and racks of commercial automobile bodies. Wt 50 lbs per cu ft. (air-dried) Maximum crushing strength 10,700 lbs per sq in Shearing strength parallel to grain 2,340 lbs per sq. in

shakes (lumber) Imperfections in timber caused during the growth of the tree by high winds or imperfect conditions of growth.

shearing (ship) Cutting or trimming the edges of a steel member

shearing strength (StM) The resistance offered by a material to a force tending to cause one layer of the material to slide over an adjacent layer

shearing stress (StM) A stress that tends to slide one part of a body upon another

shears (tool) A tool used for cutting sheet metal of various kinds and thicknesses. Straight blade tinner's shears are used for making straight cuts Shears with curved blades are convenient for making curved cuts. Scroll pivoter snips turn easily and follow an irregular line readily Bench shears are used for cutting metal of 16 gage and lighter Bolt cutters are used for cutting bolts or small bars of metal.

sheathing (bldg) Wall boards, roofing boards, generally applied to narrow boards laid with a space between them, according to the length of a shingle exposed to weather.

sheathing paper (bldg) The paper used under siding or shingles to insulate the house. Also called building paper

shed (text). An opening in the warp through which the shuttle passes, caused by raising and lowering the heddle frames.

shedding (text) A term used in weaving to describe the opening in the warp yarns for one passage of the shuttle

sheer (ship) The upward curvature of the lines of a vessel toward the bow and stern. The line of form at the side which the gunwale or deck edge follows in profile.

sheer plan (ship) A verticle, longitudinal, center line section of a vessel.

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on the rebound of the spring, while the double acting acts on both compression and rebound movements. Shock absorbers are normally used on all four wheels of passenger cars, but only on the front wheels of commercial vehicles. There are friction, pneumatic, spring, and hydraulic types of shock absorbers

shoddy (text) A broad term for all reclaimed wool.

shoe (RR). The collecting member of a current collector of the sliding contact type. The term is usually preceded by a designating name, thus third-rail shoe, trolley shoe, pantograph pan, etc.

shore (ship). One of the many wooden props by which the ribs or frames of a vessel are externally supported while building, or by which the vessel is held upright on the ways.

shoring (bldg) The act of supporting anything by shoring it up

short-circuit (el) An abnormal connection of relatively low resistance, whether made accidentally or intentionally, between two points of different potential in a circuit.

shorten sail (nav). To lessen or to douse sail, usually used as a command to take down sails

shortleaf pine (*pinus echinata*) Used for interior finish and flooring Wt. 38 lbs. per cu. ft. (air-dried) Maximum crushing strength 8,660 lbs. per sq in. Shearing strength parallel to grain 1,390 lbs. per sq in.

shower (met) Sporadic rain or snow associated with cumulus clouds or their modifications

shroud line (aer) The suspension cords of a parachute which attach the harness to the canopy

shroud pads (ship). Devices for attaching shrouds or guy cables to crosstree and bulwark.

shrouds (ship). Lines stretched from the masthead to a boat's rail. They support the mast on each side.

shroud whip (ship) Lines used to haul the shrouds taut.

shunt-wound motor (el) A direct-current motor in which the field circuit and armature circuit are connected in parallel.

shutter (phot) The device on a camera which opens and closes at various speeds to admit light to the sensitive film

sidebands (rad) The frequency bands on either side of the carrier frequency within which fall the frequencies of the waves produced by the process of modulation. Usually the width of a transmitted sideband is limited to a band width no greater than the band width of the modulating wave.

side break switch (el) A switch in which the travel of the blade is in a plane parallel to the base of the switch. Also called horizontal break switch.

side car (aer) A car suspended off the center line of an airship, also called "wing car"

side circuit (tg-tp) A circuit arranged for deriving a phantom circuit. In the case of two-wire side circuits, the conductors of each side circuit are placed in parallel to form a side of the phantom circuit. In the case of four-wire side circuits, the lines of the two side circuits which are arranged for transmission in the same direction provide a one-way phantom channel for transmission in that same direction, the two conductors of each line being placed in parallel to provide a side for that phantom channel. Similarly the conductors of the other two lines provide a phantom channel for transmission in the opposite direction.

side cutting pliers (el). See pliers.

side direction (stress analysis) (aer) The direction perpendicular to the plane of symmetry

side fender (ship) A longitudinal timber projecting beyond the outside line of the hull planking, often metal faced, to protect the hull.

side force (stress analysis) (aer). A force, or component, perpendicular to the plan-

silk (text) 1 Boiled-off silk. Silk with the sericin (gum) removed. 2. Raw silk silk as it is reeled from the cocoon. 3 Thrown silk raw silk that has been degummed, twisted, doubled, and twisted as organzine, tram, crepe fabrics (high twist), embroidery (heavy twists), etc.

silk screen stencil (print) The latest development in silk screen printing is the use of a photographic emulsion which is light-hardened to the screen for non-printing portions, permitting the paint to go through the screen when the excess emulsion is washed out to open up the printing areas. Fine line cuts and even halftones are produced by this method as well as reproductions of type. In hand work, a filler is painted on the screen's non-printing areas to stop the ink or paint from going through Also known as "paint process" and "paint screen process"

sill (engr) The member of a bridge support which rests directly upon the ground or upon a footing.

sills (bldg) The horizontal timbers of a house which either rest upon the masonry foundations or, in the absence of such, form the foundations

silver (Ag) A lustrous white metal which is soft, ductile and malleable. It is an excellent conductor of heat and electricity Silver has attained an important position as a substitute for metals which are difficult to obtain today It may be used in place of copper, nickel, chromium, and zinc in many of their applications. At. no 47, at. wt. 107 880, m.p 960 5° C.

simple equation (alg) An equation having only one unknown quantity which does not appear as a denominator of any fraction nor with any exponent higher than 1. Also known as an equation of the first degree

simple microscope (opt) One having only one lens or one set of lenses.

simple pendulum (phy) A particle suspended by a weightless rod or cord, a body suspended by a cord whose weight is neglected, the body being treated as if it were concentrated at its center of gravity

simple tackle (rigging) Consists of one or more blocks rove with a single rope.

simplexed circuit (tg-tp) A circuit which can be used simultaneously for telephony and direct-current telegraphy or signaling, separation between the two being accomplished by using the sides of the circuit in parallel for telegraph operation or signaling

simplex operation (tg) See single operation.

simultaneous equations (alg) Two independent equations which have common solutions.

singeing (text). See gassing

singing (tp). Singing in a transmission system is an undesired self-sustained oscillation existing in the system

single cut (mach) A file tooth arrangement formed by a single series of cuts.

single element relay (el) An alternating-current relay having a set of coils energized by a single circuit.

single-end control (RR). A control in which provision is made for operating a vehicle from one end only As distinguished from "double-end control."

single float (aer). A single central float fitted under a seaplane and usually requiring two stabilizing floats to give adequate stability and complete the float system.

single operation (tg) Also called "simplex operation." Operation in only one direction at a time. A distinction is sometimes made between single operation and simplex operation in applying single operation to Morse telegraphy and simplex operation to printing telegraphy Another distinction is sometimes made in applying single operation to the operation of channels which may be worked in either direction at the will of the operators, and simplex operation to the operation of channels which are set up to carry signals in one direction only

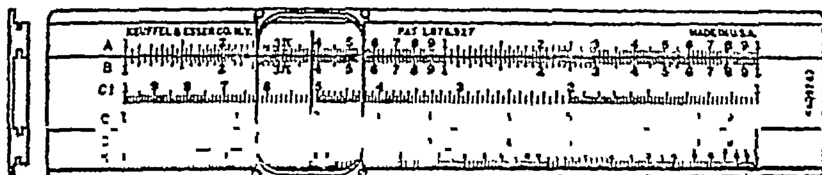
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SLIDE RULE



(Illustration Copyright, Keuffel & Esser Co.)

turns to the earth after being reflected by the ionosphere. See also ground wave, sky wave

skirting (text) The removal of the tag ends and torn edges from a fleece of wool.

skylight (ship) A framing of metal fitted over an opening in a deck, with window glass inserted for the admission of light into a cabin, engine room, etc.

sky wave (rad) That part of the radiation from an antenna which is propagated at an angle above the horizontal. It is partly absorbed and partly reflected to the earth by the ionosphere, an ionized layer of the earth's atmosphere about 70 miles above the surface of the earth. See also ground wave, skip distance.

sky writing (aer) The act of emitting from an aircraft a trail of smoke or other visible substance, the flight of the aircraft being so directed as to cause the trail to assume the form of letters or symbols.

slack (nav) To lessen tension on a rope by letting it run out.

slag (metal). A molten or solidified substance consisting of oxides in combination with the fluxing material used in smelting operations. Also called "cinder" or "scoria" The non-metallic fused by-product of a furnace operation.

slag cement. Cement which uses powdered slag as a base.

slag inclusion (weld). Non-metallic material entrapped in a weld.

slag wool (text) Obtained when steam or hot air is blown through molten slag. It is an intermingled mass of filaments grayish-yellow in color Used as a substitute for asbestos.

slaked lime (chem). A dry powder consisting essentially of calcium hydroxide or a mixture of calcium hydroxide, magnesium oxide, and magnesium hydroxide. It is obtained when quicklime is treated with water Used in the building industry for the preparation of mortar, as a fluxing agent, and for wire drawing Also called hydrated lime, calcium hydroxide, and calcium hydrate.

slat (aer) A movable auxiliary airfoil, attached to the leading edge of a wing, which when closed falls within the original contour of the main wing and which when opened forms a slot.

sledge (tool). A type of hammer weighing from 4 to 20 pounds and having a handle from 30 to 36 inches long It is used only on work requiring an exceptionally heavy blow, such as blacksmith forging

sleeper (bldg) A timber laid on the ground to support a floor joist. (RR) A transverse wooden support for steel rails.

sleeve (aer) See deflation sleeve, inflation sleeve, towing sleeve.

sleeve (tp) The sleeve of a plug is the cylindrical contacting part of the plug immediately back of the ring.

sleeve valve (aut) The ports or slots cut into sliding cylinders or sleeves of an engine which open and close by moving up and down to admit the fuel mixture or to expel the exhaust gases.

sleying (text) Drawing the warp threads through the dents of the reed.

slot weld A weld made in an elongated hole in one member of a lap joint, joining that member to that portion of the surface of the other member which is exposed through the hole. The hole may be open at one end, i.e., may extend to the edge of the member, and may or may not be filled completely with weld metal.

slub (text) An abruptly thickened place in the yarn, or a bunch of lint entangled in the yarn, cord, or fabric. Also called "slug"

slubbing (text) A stage of manufacture of yarn before it is drawn into roving

slug (phy) See mass.

slug (print) 1 A thick lead. In newspaper and other piecework it has a word or figure on it to denote the compositor to whom the matter following belongs See "linotype slug" 2. In a newspaper composing room, the copy takes are numbered or marked with big letters and figures as A1, A2, A3, etc., through the alphabet, and up to 99. The type is placed on galleys and the "bank man" handling the galleys puts big metal slugs corresponding to the numbers on the takes just ahead of each section of type These slugs are called "galley slugs," or "number slugs"

sluice (ship) An opening in the lower part of a bulkhead fitted with a sliding watertight gate or door having an operating rod extending to the upper deck or decks.

slur (print) A blurred impression Slurring is due to a disturbance of the sheet when the impression of the form is made

small caps (print) Nearly all fonts of type intended for book work have, in addition to the usual capitals, an alphabet of small capitals. These are slightly larger than the small letters of the lower-case font, and are often used for side-headings, subheads, running titles and in other places where some variation from the other alphabets is desirable. THIS IS AN EXAMPLE OF SMALL CAPS.

small wiring (el) The wiring used for control circuits and for interconnecting instruments, meters, relays, instrument-transformer secondaries, and other equipment mounted on the rear of panels, on the panel frame or on a structure integral with the panel supports. Also called secondary and control wiring

smash (text) A place in the fabric where a number of warp or filling yarns have been broken during weaving

smooth cut (mach) File coarseness between "second cut" and "dead smooth"

smoothing plane (carp) This plane varies in length between 5½ and 10 inches and has blades 1¼ to 2⅝ inches wide. It is used for smoothing rough surfaces where straight edges and sides are not required.

snake (el) A tempered steel wire, usually of rectangular cross-section, which is pushed through a run of conduit, or through an inaccessible space, such as a partition, and used for drawing in the wires Also called "fishing wire."

snap gage (mach) A gage used almost exclusively in production work for checking the dimensions of round or flat surfaced pieces Also called outside caliper gage As a rule it has a "go" and "no go" end.

snatch block (rigging) A single block with the shell open at one side to admit a rope without passing the end through.

snow line (met) The limit of snow cover either on a continent or on a mountain.

snub (nav) To check a rope or chain suddenly

soaking pit (foundry) A special heating furnace built below the foundry floor level so that long ingots can be lowered into it.

soar (aer) To fly without engine power and without loss of altitude, as does a glider in ascending air currents

socket (el) See lampholder

socket wrench (tool) A wrench frequently used in automotive work, where it is

in form and operating on a movable core or plunger

sole plate (ship) See foundation plate.

solidity (aer) The ratio of the total blade area of a rotor to the area of the disk swept by the blades

solstice (met) The time of year at which the sun has a maximum or minimum declination.

sonic altimeter (air nav) An altimeter utilizing sound waves

sound recording (moving pictures) A microphone catches the sound waves and converts them into variations in an electric current. These variations are then amplified and used to control the intensity of a light so that the variations of sound become variations of light intensity. These in turn are recorded on a film.

sound track (phot) A strip between the picture area and perforations of sound film on which is printed the graphic image of sound vibrations. Two kinds of sound tracks are used. In one, the sound track is of constant width but varies in density along the film. In the other, the track varies in width but is of constant density.

sounding balloon (met) A small balloon used to send up a meteorograph.

sounding pipe (ship) A pipe leading from main deck to double bottom, of sufficient size to allow a round piece of metal attached to a line to be lowered in order to ascertain the amount of liquid in the double bottom.

south declination (nav) The celestial declination of a point which is south of the celestial equator It is always regarded as negative.

south pole (el) The end of a magnet at which the lines of force enter (return), opposite to the north pole of the magnet.

Soya oil (chem) Soy oil, Soya bean or Chinese bean oil, made up of glycerides of certain fatty acids, used in the manufacturing of soaps paints and varnishes.

space-charge grid (rad) A grid which is placed adjacent to the cathode and positively biased so as to reduce the limiting effect of space charge on the current through the tube.

spacing of rivets (ship) The distance from the center of one rivet hole to the center of the next, depending on the diameter of the rivets and the purpose for which they are employed

span (aer) The maximum distance, measured parallel to the lateral axis, from tip to tip of an airfoil, of an airplane wing inclusive of ailerons, or of a stabilizer inclusive of elevator

span (bldg) The distance between the bearings of a timber or arch.

span (engr) The portion of a bridge between centers of two adjacent supports, alternately, the distance between such centers

span loading (aer) The ratio of the weight of an airplane to its equivalent monoplane span.

spar (chem) See fluorspar

spar (ship) A pole used for a hoist or in scaffolding Masts, booms, and gaffs are also spars

spare shaft (ship) An extra tail shaft. Steamers generally carry one or more stowed in the shaft alley

spark (aut) The mechanism for controlling the time of ignition or "spark," properly called the "spark lever" The spark is generally advanced at high engine speeds and retarded at low engine speeds

spark coil (el) See induction coil.

spark gap (el) An arrangement of two electrodes between which a disruptive discharge of electricity may take place, and such that the insulation is self restoring after the passage of a discharge.

spark lever See spark

sparkover (el) A disruptive discharge between electrodes of a measuring gap, such as a sphere gap or coil testing gap.

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spiral (aer). A maneuver in which an airplane descends in a helix of small pitch and large radius, the angle of attack being within the normal range of flight angles (cf. spin)

spiral (mach). 1 The path of a point that moves around an axis while continually approaching or receding from it. 2. A helix.

spiral bevel gear (aut) A bevel gear having curved teeth.

spiral instability (aer) A type of instability, inherent in certain airplanes, which becomes evident when the airplane assumes too great a bank and side slips, the bank continues to increase and the radius of the turn to decrease.

spiral ratchet screwdriver (tool) A type of screwdriver used to drive or remove small machine screws rapidly Commonly known as a "Yankee" screwdriver

splice (el) See cable joint.

splice (rigging). The joining of two ropes or two parts of the same rope by interweaving the strands without materially increasing the size of the original ropes.

splicing (text) Hose reinforced by a different kind of yarn in heel and toe to add strength. It is usually cotton.

splicing sleeve (el) See connector

spline (aut) A series of parallel keys integral with a shaft, mating with corresponding grooves cut in a hub or fitting

spline (ship) A flexible strip used for fairing lines.

spline plate (ship) A vertical plate on the center line of a nose plate above the stem casting

split flap (aer) A hinged plate forming the rear upper or lower portion of an airfoil The lower portion may be deflected downward to give increased lift and drag, the upper portion may be raised over a portion of the wing for the purpose of lateral control (cf upper-surface aileron)

split S (aer) A maneuver consisting of a half snap roll followed by a pull-out to normal flight, thus obtaining a 180 degree change in direction accompanied by a loss of altitude.

spoiler (aer) A small plate arranged to project above the upper surface of a wing to disturb the smooth air flow, with consequent loss of lift and increase of drag (cf. interceptor)

sponge (electrolysis) A loose cathode deposit which is fluffy and of the nature of a sponge, contrasted with a firm reguline metal

sponging (text) Process of shrinking fabrics before cutting into garments by wetting the cloth, squeezing out the surplus water, and drying

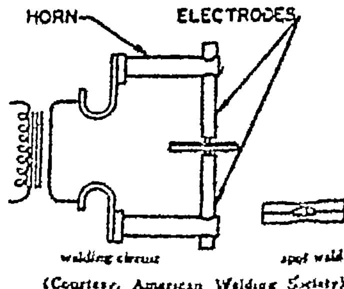
sponson (aer) A protuberance from a seaplane hull designed to increase the beam or give lateral stability at rest.

spot-faced (ship) A term that indicates that an annular facing has been made about a bolt hole to allow a nut or head to seat evenly

spotlight (aut) A lighting unit, mounted on a manually operated adjustable bracket, which has one focusing type reflector and one focusing type light source.

spotting (phot) The filling in of spots or imperfections in a negative or print by means of india ink or spotting color with a fine brush.

spot welding. A resistance welding process wherein the fusion is confined to a rela



(Courtesy, American Welding Society)

stabilizer (aer) (aerostat) The same as fin.

stabilizing float (aer) A float used in addition to a single float or hull and intended to provide lateral stability while the seaplane or flying boat is at rest on the water Also called "side float."

stable oscillation (aer). An oscillation whose amplitude does not increase

stadia (surv) A device for measuring distances by reading an intersect on a graduated rod. For this purpose two additional horizontal hairs called "stadia hairs" are carried in the transit telescope on the same reticle as the cross hairs and are placed equidistant from the horizontal hair By reading the amount of intersect on a rod between the upper and lower wires, multiplying this by a constant, usually 100, and then adding a second constant, expressed (c plus f) the distance from the center of the instrument to the point on which the rod is held is fairly accurately determined.

stage (ship) A platform of boards or planks, hung in ropes or otherwise supported, for a person to stand upon when cleaning, scraping, or painting the outside or inside of a vessel.

stagger (aer). A term referring to the longitudinal position of the axes of two wings of an airplane Stagger of any section is measured by the acute angle between a line joining the wing axes and a line perpendicular to the upper wing chord, both lines lying in a plane parallel to the plane of symmetry The stagger is positive when the upper wing is in advance of the lower.

stagger (ship) To zigzag a line or row of rivet holes, etc.

staggered intermittent fillet welds Two lines of intermittent fillet welding in a tee or lap joint, in which the increments of welding in one line are staggered with respect to those in the other line

staggered riveting (ship). Two rows of riveting with alternating spaces Also called "zigzag riveting"

stagger wire (aer) A wire connecting the upper and lower wings of an airplane and lying in a plane substantially parallel to the plane of symmetry Also called "incidence wire."

staging (bldg) See scaffold.

stainless steel (metal) A chrome steel containing up to 30 per cent chromium and having marked resistance to corrosion.

stairway stringer (ship) A channel or flanged plate used in making the sides of a set of stairs

stake (sheet metal) Any one of a great variety of forms over which sheet metal is shaped. Stakes are to the sheet metal worker what the anvil is to the blacksmith. There are double seaming stakes, round head stakes, solid mandril stakes, creasing stakes, beam horn stakes, etc.

stall (aer) The condition of an airfoil or airplane in which it is operating at an angle of attack greater than the angle of attack of maximum lift.

stalling speed (aer) The speed of an airplane in steady flight at its maximum coefficient of lift.

stanchion (ship). A pillar or iron post for supporting the decks, etc.

standard atmosphere (aer) An arbitrary atmosphere used in comparing the performance of aircraft. The standard atmosphere in use in the United States at present represents very nearly the average conditions found at latitude 40° and is completely defined in N.A C.A. Report No. 218

standard atmosphere (text) Air maintained at a relative humidity of 65 per cent and at a temperature of 70° F

standard code (RR) The train, block signal and interlocking rules of the Association of American Railroads.

standard international atmosphere (aer) The atmosphere used as an international standard presumes for mean sea level and a temperature of 15° C., a pressure of 1,013.2 millibars, lapse rate of 6.5° C.

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statics (phy) The branch of dynamics which deals with bodies in equilibrium, situations in which the several forces are so related as to balance or neutralize each other so far as giving the body motion as a whole is concerned.

static stability (aer) That property of an aircraft which causes it, when its state of steady flight is disturbed, to develops forces and moments tending to restore its original condition.

static strength (StM) Resistance to a constant load, or to one gradually applied.

static torque (el) See locked rotor torque.

static tube (aer) A cylindrical tube with a closed end and a number of small openings normal to the axis, pointed upstream, used to measure static pressure.

station (surv) This term was originally applied only to the actual point indicated by the numbered stake, but now it is universal practice in the United States to use the word "station" in referring to either the point or the 100-foot unit distance. A fractional station is called a "plus" for the reason that a plus sign is used to mark the decimal point for the 100-foot unit, the common decimal point being reserved for fractions of a foot. The initial or starting stake of a survey is numbered zero

stationary front (met) A front whose slope is such that neither the warm nor cold airmass is able to intrude into the area occupied by the other

station pressure (air nav) The existing atmospheric pressure at the elevation of the mercurial barometer located in the weather station.

stator (el) The portion of a machine which contains the stationary parts of the magnetic circuit with their associated windings.

stays (ship) Bars used for binding or supporting or holding parts together

stealer plate (ship) A plate taking two strakes used near either end of the ship Also called "stealer"

steamfitter A pipefitter who specializes in in steam and hot water heating systems.

steam hammer (metal) A steam-driven hammer used for forging metal, consisting of an anvil and a hammer attached to a piston which moves up and down in a steam cylinder

steel square (carp) See framing square

steel tapes (surv) Steel tapes come in various lengths up to 500 feet and 150 meters and are marked by etched graduations and numbers, or by clamped or soldered sleeves carrying the mark and number The standard engineer tape is 100 feet long Some tapes are divided decimally throughout their length into feet, tenths, and hundredths, while on others the foot marks only are shown, with the last foot on each end (or on one end) divided into tenths and hundredths

steel wool. Consists of fine shavings of steel made by a special machine. Used as an abrasive and cleanser In cabinet making it is used as a substitute for sandpaper in rubbing down shellac and varnish coats.

steerage (ship) The after part of a vessel having the poorest accommodations and occupied by the steerage passengers, or those paying the lowest fare.

steering gear flat (ship) The deck above the stern overhang, on which the rudder steering mechanism is installed.

steering knuckles (aut) The pivoting ends of a front axle, consisting of the steering knuckle proper and the steering knuckle arms which are connected to the steering column by a tie-rod.

steering mechanism (aut) A motor vehicle is steered by turning both front wheels The wheels, which are mounted on movable steering knuckles turn in vertical yokes at the ends of the front axle. The steering knuckles are held in the yokes by steering knuckle pivots (kingpins) The front wheels rotate on bearings which are mounted on the spindles of the steering knuckles The steering knuckle pivots (kingpins) are generally

[illegible] A break in the form of the [illegible], to lessen the [illegible] effects, [illegible]

[illegible] transformer (el). A transformer in which the energy transfer is from a high [illegible] to a low voltage [illegible]

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stern-drop (aer) A deformation of an airship in which its longitudinal axis bends downward at the after end.

stern fast (ship) A stern painter for use in securing the stern of a point.

stern frame (ship) See stern casting

stern framing (aer) All framework, aft of the cruciform girder, necessary to complete the shape and contour of a rigid airship.

sternheavy (aer). The condition in which, in normal flight, the after end of an airship tends to sink and which requires correction by means of the horizontal controls. It may be due to either aerodynamic or static conditions or to both. (cf. bowheavy)

stern hook (ship) Same as breasthook, for stern on a double-ended boat.

sternpost (ship) 1. A massive casting of special design, shaped to allow the propeller blades to revolve. The rudder is fitted on the after post. 2. In wooden ships, the principal vertical piece of timber at the after end of a boat, its lower end fastened to the keel or shaft log by a stern knee.

stern sheets (ship) The space in the boat abaft the thwarts.

stern tube (ship) The bearing which supports the propeller shaft where it emerges from the ship A cast steel cylinder fitted with brass bushings which are lined with lignum vitae, or metal bearing surfaces, upon which the propeller shaft, enclosed in a brass sleeve, rotates.

stern-weighing device (aer) An instrument located near the stern of an airship for measuring its buoyancy (cf. bow-weighing device)

stiffener (engr). A girder or truss used to stiffen the superstructure of a bridge and to aid in carrying the weights imposed upon it.

stiffener (ship) An angle bar or stringer fastened to a surface to strengthen it and make it rigid.

stiff materials (StM) Those which have a high modulus of elasticity They deform little, if subjected to stresses not exceeding the elastic limit.

still (chem) An apparatus in which a substance is changed by heat with or without chemical decomposition into a vapor, which vapor is then liquefied in a condenser and collected in another part of the apparatus

Stillson wrench (tool) See pipe wrench.

sting (aer) A light rod attached to and extending backward from a body for convenience of mounting when testing in a wind tunnel.

stipple (print) A printing surface that consists of dots instead of lines. The dots may be fine or coarse, to give effects of light and dark. Halftones are stipple engravings.

stock dyeing (text) Dyeing of fibers in the loose form (not yarn)

stock solution (phot) A concentrated solution of photographic chemicals capable of indefinite storage time when carefully sealed The stock solution must be diluted with water before it is used

stop bath (phot) An acid bath that neutralizes the developer on the print and stops development immediately, thus preventing streaks and stains when the prints are immersed in the fixing bath.

stop opening (phot) See diaphragm opening.

stopping condenser (rad) A condenser connected in series which introduces a comparatively high impedance for limiting the current flow of low-frequency alternating current or direct current without materially affecting the flow of high-frequency alternating current. See also "blocking condenser"

stopwater (ship) 1 A packing of felt or canvas and red lead to prevent water from passing through metal parts where calking is impracticable, as for example, in riveted ships. 2. A plug weld where a hole was cut through a plate at a point opposite which a butt of plates or

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curs. It is used to make a tight joint in welded ships.

storage battery (secondary battery or accumulator) A connected group of two or more storage cells. Common usage permits this term to be applied to a single cell used independently

storage cell (el) An electrolytic cell for the generation of electric energy in which the cell after being discharged may be restored to a charged condition by an electric current flowing in a direction opposite to the flow of current when the cell discharges

stored energy welding A resistance welding process wherein the electrical energy required to produce the weld is accumulated in a suitable storage reservoir, usually at a low rate, prior to its delivery to the weld, usually delivered at a high rate.

storm (met) A violent atmospheric disturbance, winds whose velocities lie between 60 and 70 miles per hour

straight peen (tool) The narrow rounded-edged ridge of the striking face of a hammer head, parallel to the axis of the handle.

straight polarity (weld) (electrode negative) The arrangement of direct current arc welding leads wherein the work is the positive pole and the electrode is the negative pole of the arc circuit.

strain (StM). The forces acting internally in an elastic body when it is deformed.

strainer (aut) A fine screen used to remove sediment from gasoline, located at the tank or somewhere along the gasoline line.

strake (ship). 1. A continuous row of plates. 2. In wooden ships, a continuous line of fore-and aft planking.

strap key (el). A push button circuit controller which has a spring metal strip for opening and/or closing a circuit momentarily

stratosphere (met) An isothermal layer of air above the troposphere.

stray current (el) That portion of the total current which flows through paths other than the intended circuit.

strays (rad) Electromagnetic disturbances in radio reception other than those produced by radio transmitting systems.

stream flow (eng) The quantity rate of water passing a given point.

streaming potential (el-chem) The potential difference induced between the ends of a capillary when a liquid is forced through it.

streamline (aer) The path of a particle of a fluid, supposedly continuous, commonly taken relative to a solid body past which the fluid is moving, generally used only of such flows as are not eddying

streamline flow (aer) A fluid flow in which the streamlines, except those very near a body and in a narrow wake, do not change with time.

streamline form (aer) The form of a body so shaped that the flow about it tends to be a streamline flow

strength (StM) A generic term for that property of a material by virtue of which it can resist strain or rupture induced by external forces.

stress (StM) The forces exerted on, within, or by a body during either tension or compression. The opposing reaction of the interior elements of a solid body against forces tending to deform them. Internal stress is the resistance of a physical body to external forces. It is the unit internal resistance set up by external forces.

stress analysis (aer) The aircraft engineer has an unusually difficult time in analyzing the stresses that will actually occur in a structure, these difficulties being of a twofold nature. The first trouble is in determining with a satisfactory degree of accuracy the external loads to which an airplane is subjected in flight and in take-off and landing. The second trouble is that even when the external loads are known, the science of structural analysis is fre-

quently not advanced sufficiently to permit an exact determination of the strength of the structure itself In many structural parts and shapes the laws of stress distribution are so complex that they will remain something of a mystery Static testing is the means used by the engineer to fill in the gaps in his knowledge due to the failure of theoretical methods of stress analysis to furnish all the answers to questions regarding structural strength Parts or assemblies are subjected to gradually increasing loads simulating, so far as possible, the load conditions in flight A study of the deflection of the parts under load and the determination of the crippling load or ultimate load yields information which becomes the basis for the design of the final structure.

stress relief heat treatment (weld) Uniform heating of a structure or portion thereof to a sufficient temperature, below the critical range to relieve the major portion of the residual stresses, followed by uniform cooling

stretchers (ship) Athwartship, movable pieces against which the oarsmen brace their feet in pulling.

strike (nav) To shorten or douse, to "strike" sail.

stringer (engr) One of a number of longitudinal members resting upon the end supports of a bridge and carrying the flooring

stringer (ship) A longitudinal stiffener for the side of a ship, made of angle bar, bulb angle channel, or plates, etc. Depending upon their locations, stringers are known as bilge stringers, side stringers, hole stringers, etc.

stringer plate (ship) The outboard strake of plates next to the shell.

stripping (chem), (met) Chemical stripping is the removal of a metal coating by dissolving it.

tripping (mech) (met) Mechanical stripping is the removal of a metal coating by mechanical means.

stripping (electrolytic) (met) Electrolytic stripping is the removal of a metal coating by dissolving it anodically with the aid of a current.

stroke (aut) The distance a piston travels up and down inside a cylinder

strongback (ship) 1 The spar between the davits to which a boat is griped. 2 A bar for locking cargo port doors and watertight scuttles. 3 A portable beam to hold hatch covers and deck loads

strong beam (ship) A portable beam over the engine and boiler room space in the engine and boiler room casing, carrying a traveling hoist.

structure conflict (el) Structure conflict (as applied to a pole line) means that the line is so situated with respect to a second line that the overturning (at the ground line) of the first line will result in contact between its poles or conductors and the conductors of the second line, assuming that no conductors are broken in either line

strut (aer) A compression member of a truss frame

strut (ship) A strip of flat iron, or two such strips, used to brace one part with another.

stub-wing stabilizer (aer). A projection from the side of a flying boat intended to increase the buoyancy and stability of a flying boat while the boat is at rest and to increase the hydrodynamic lift during the take off It is an integral of the hull, and usually takes the form of a stumpy airfoil on a stub wing

stucco (bldg) A fine plaster used for interior decoration and fine work, also for rough outside wall coverings.

stud (aut) A rod (bolt) with threads cut on both ends Studs, having one end screwed into an engine cylinder block, secure the cylinder head to the block by means of nuts on the other threaded end.

studding (carp) The framework of a partition or the wall of a house, usually referred to as 2 x 4 s

studio scales. A small balance designed for the weighing of very small quantities of a solid, generally used in the chemistry laboratory.

stud wrench (tool) A wrench used with a socket wrench handle for removing or setting studs. A knurled cam bears against the stud, gripping it forcefully so it can be turned in or out.

stuffing box (el) A device for use where a cable passes into a junction box or other piece of apparatus and is so designed as to render the joint watertight. Also called watertight gland.

subassembly drawings. Drawings which show several details assembled in their working order, but are only a part of the main assembly. Subassemblies are frequently shown in section to indicate more clearly the relation of the various details in the assembly. Subassembly drawings have a part number, which is the number applied to that particular combination of details. Subassemblies have the details designated with their proper part numbers.

subcloud car (aer) An observation car which may be lowered from an airship to a position below the clouds.

subharmonic (rad) A sinusoidal quantity having a frequency which is an integral submultiple of the frequency of some other sinusoidal phenomenon to which it is referred. For example, a wave the frequency of which is half the fundamental frequency of another wave is called the second subharmonic of that wave.

sublimation (met) A process in which water vapor changes into solid water.

submarine cable (el) A cable designed for service under water. Submarine cable is usually a lead covered cable with a steel armor applied between layers of jute.

submicrons (phys) Those particles visible in the ultramicroscope. Ultramicrons cf. amicrons.

subsidence (met) The sinking of a total layer of air over a wide area.

subtrahend (math) The number which is subtracted in the process of subtraction.

succinic acid (chem) Used in the manufacture of dyes and lacquers.

sudden pull up (or sudden pull-out) (stress analysis) A loading condition for the tail surfaces resulting from a sudden application of up-elevator (cf dive)

suiting (text) A general term applied to a variety of weaves, weights, and finishes. Weaves are plain, fancy, or twill.

sulphate wood pulp (paper) Prepared by digesting wood with a mixture of sulphate of soda, caustic soda, and sulphide of soda. Also called "sulphite pulp."

sulphite pulp (paper) Pulp made from wood chips cooked under pressure in a solution of bisulphite of lime.

sulphur (S) A pale yellow crystalline substance, found free and combined. There are four allotropic varieties: rhombic crystals, prismatic needles, plastic, and white amorphous. At. wt. 32.06, at. no 16, m.p 114.5° C, b.p 448° C., sp. gr rhombic 2.05, prismatic 1.98, plastic 1.95.

sun compass (aer) A compass in which the direction of the sun is utilized instead of the direction of the magnetic north or south pole.

sunk forecastle (ship) A forecastle partly above and partly below the level of an upper deck.

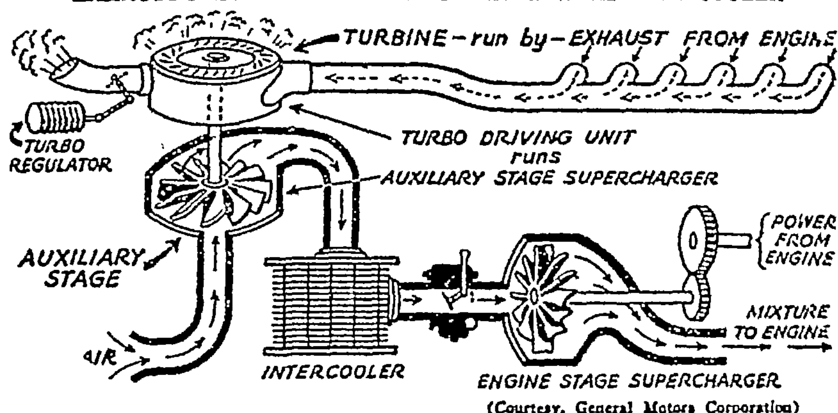
sunk poop (ship) A poop set part way down into the 'tween decks. In a case of this kind, the poop deck is but a little above the next deck forward.

super (book) A cotton cloth resembling cheese cloth, glued and starched, and pasted on the back of sewed signatures, to hold the book and cover together.

supercalendered (paper). When paper has been given an extra smooth finish or glaze in the calender rolls during manufacture, it is said to be supercalendered.

supercharge (aer) To supply an engine with more air or mixture than would be inducted normally at the prevailing at-

EXHAUST-DRIVEN TURBOSUPERCHARGER WITH INTERCOOLER



(Courtesy, General Motors Corporation)

mospheric pressure. The term supercharged is generally used to refer to conditions at altitudes where the pressure in the intake manifold is partly or completely restored to that existing under normal operation at sea level (cf boost)

supercharged engine (aer). An engine with a compressor for increasing the air or mixture charge taken into the cylinder beyond that inducted normally at the existing atmospheric pressure.

supercharger (aer) A pump for supplying the engine with a greater weight of air or mixture than would normally be inducted at the prevailing atmospheric pressure.

supercharger control bypassing (Roots). Regulating the pressure of the air supplied to the carburetor by discharging into the free atmosphere the excess delivered by the supercharger

supercharging (aer-aut). Compressing the air or the intake mixture to increase the weight of charge going into the engine Frequently called "boosting"

supercooling (met) Lowering the temperature of water or cloud drops below freezing temperature without freezing them.

superheat (aer) The amount by which the temperature of the gas in the envelope or gas cells of an aerostat exceeds the temperature of the surrounding air. If the gas has a lower temperature, the superheat is said to be negative

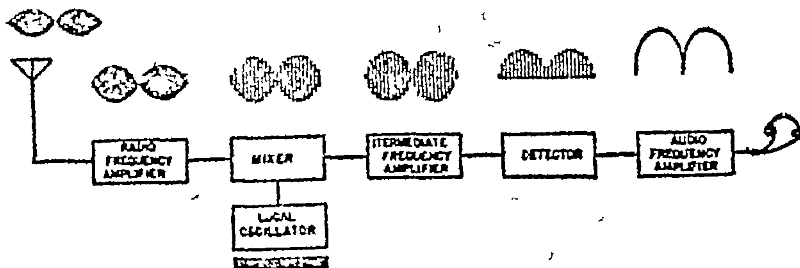
superheated. Said of steam heated above the temperature at which moisture can form. Also called "dry steam".

superheterodyne reception (rad) A method of receiving radio waves in which the process of heterodyne reception is used to convert the voltage of the received wave into a voltage of an intermediate, but usually superaudible, frequency, which at the intermediate frequency is then detected with or without amplification. See illustration, page 293

superposed circuit (tg-tp) An additional channel obtained from one or more circuits normally provided for other channels in such a manner that all the channels can be used simultaneously without mutual interference.

superpressure (aer) The excess of pressure at the bottom of an airship gas cell or envelope over the outside atmospheric pressure.

superstructure (ship). Any structure built above the top full deck, such as a deck house, bridge, etc.



Block diagram of a superheterodyne receiver

(Courtesy, Civil Aeronautics Authority)

suppressor grid (rad) A grid which is interposed between two electrodes (usually the screen grid and plate), both positive with respect to the cathode, in order to prevent the passing of secondary electrons from one to the other

surd (alg) An irrational number or quantity, especially an indicated root that cannot be extracted. Example: Square root of 2.

surface gage (mach). The surface gage is used for laying out work for all classes of machine tools. The ordinary surface gage consists of a heavy base, an upright, and an adjustable scriber In the universal surface gage, the upright spindle is pivoted to the base so that it may be set at any angle, in some cases the base is grooved so the gage may be used on round work as well as flat surfaces.

surface leakage (el) The passing of current over the boundary surfaces of an insulator rather than through its volume.

surface plate (mach) A plate, usually of cast iron, having a true plane (flat), surface, used as a standard of flatness.

surge (in an electric circuit). A transient variation in the current and/or potential at a point in the circuit.

surveying. The art of measuring distances and angles for locating points on the surface of the earth. When the area to be surveyed is small so that the effect of the earth's curvature may be neglected, it is called "plane surveying," when the area is larger so that the effect of curvature of the earth must be considered, it is called "geodetic surveying"

surveyor's chain. A chain 66 feet long containing 100 links, each link 7.92 inches long Ten square chains equal one acre. Cf. engineer's chain.

surveyors' measure.
7.92 inches = 1 link.
25 links = 1 rod.
4 rods = 1 chain.
10 square chains & 1 acre = 160 square rods.
640 acres = 1 square mile or section.
36 square miles = 1 township.

suspension. 1. A collective term for the spring system of a motor vehicle. 2. A term indicating the mounting or method of mounting of an engine, i.e., three point suspension, four-point suspension, etc. 3. A term referring to the diffused, floating state of undissolved or partly dissolved particles in a liquid.

suspension band (aer). A horizontal fabric band, securely fastened to the envelope of a balloon or airship, to which are attached the main suspension lines of the basket or car, or the captive cable of a kite balloon.

suspension bar (aer) A bar to which the suspension ropes of the balloon basket are secured. It is also fitted with ropes and toggles for attachment to the basket

suspensions from the envelope or net, also called "trapeze bar," and "suspension ring"

suspension basket (aer) The suspension by means of which the basket of a kite balloon is supported beneath the balloon body proper It is independent of the winch suspension

suspension line (aer) A line attached to the hull or envelope of an airship for supporting an appendage, such as a car or fin.

suspension patch (aer) A patch, secured to the envelope or to a gas cell of an aerostat, to which a suspension line may be attached.

sustained oscillation (el) The sustained oscillation of a system is the oscillation when forces outside the system, but controlled by the system, maintain a periodic isolation of the system with a period which is nearly the natural period of the system Example pendulum actuated by a clock mechanism. Also called "sustained vibration"

swash bulkheads (ship) Longitudinal or transverse bulkheads fitted in a tank to decrease the swerving action of the water Their function is greater when the tanks are partially filled. Without them the unrestricted action of the liquid against the sides of the tank would be severe.

swash plate (ship) A plate fitted in a tank to retard the flow or surge of liquid cargo or ballast when the ship rolls or pitches

sweepback (aer) The acute angle between a line perpendicular to the plane of symmetry and the plan projection of a reference line in the wing

sweetgum (wood) See *redgum*.

swell (met) An ocean wave created by a wind either present over the given area or at some distance.

swinging (rad). The momentary variation in frequency of a received wave.

swing ship (nav) To head the ship successively on various points of the compass for obtaining the error of the compass. The error may be obtained on one heading without swinging

Swiss pattern A large series of files of various shapes and a range of cuts of their own, designed principally for precision work in the jewelry, die making, silversmith, clock-making, watch making and other industries

switch (el) A device for making, breaking, or changing the connections in an electric circuit. In controller practice a switch is considered to be a device operated by other than magnetic means

switchboard (tp) See telephone switchboard.

switchboard lamp (tp) A small electric lamp associated with the wiring of a switchboard in such a way as to give a visual indication of the status of a call, or to give information concerning the condition of trunks, subscriber lines, apparatus, etc.

switchgear (el) A general term covering switching and interrupting devices, also assemblies of those devices with control, metering, protective and regulatory equipment with the associated interconnections and supporting structures.

switchhouse (el) An outdoor switching structure enclosed on all sides and top to form a weather-proof construction. Control, protective, meter, fixed, primary switching and other related equipment are mounted inside. Access to interior is provided by doors, front and rear.

sycamore (*platanus occidentalis*) Used in furniture making, interior finish and planking Wt 34 lbs. per cu. ft. (air-dried) Maximum crushing strength 6,280 lbs per sq in. Shearing strength parallel to grain 1,460 lbs per sq in

symmetrical lenses (phot). Lenses in which the construction of both front and rear elements is the same

synchro-mesh transmission (aut). A type of constant-mesh transmission that per-

SYNCHRO-MESH TRANSMISSION

(Courtesy, General Motors Corporation)

mits gears to be selected without clashing by synchronizing the speed of mating parts before they engage It employs a combination metal to-metal friction cone clutch and a dog or gear positive clutch to engage the main drive gear and second speed main shaft gear with the transmission main shaft. The friction cone clutch engages first, synchronizing the driving and driven members, after which the dog clutch engages easily without clashing. This process is accomplished in one continuous operation when the driver declutches and moves the control lever in the usual manner Synchro-mesh transmissions vary in construction with different manufacturers but the principle is the same in all.

synchronism (el). Synchronism expresses the phase relationship between two or more periodic quantities of the same period when the phase difference between them is zero.

synchronize. To make two or more events or operations occur at the proper time with respect to each other

synchronizing of images (television) The maintaining of the time and space relations between part of the transmitted and reproduced pictures.

synchronous motor (el) A synchronous machine which transforms electric power from an alternating-current system into mechanical power Synchronous motors usually have direct-current field excitation

synthetic rubber (chem) There are five types of synthetic rubber. 1 Neoprenes. 2. Thiokol. 3 Buna rubbers consisting of Perbunan, Buna S, Buna N, Ameripol, Hycar, and Chemigum. 4. Plasticized polymers of vinyl chloride, consisting of Koroseal, Korogel, and Flamenol. 5 Polymers of isobutylene, consisting of Vistanex, Butyl rubber. For details concerning these, see under their respective entries

T

tab (aer) An auxiliary airfoil attached to a control surface for the purpose of reducing the control force or trimming the aircraft.

tabby (text) A weft thread passing regularly under and over every other warp thread.

tachometer (aer) An instrument that measures in revolutions per minute the rate at which the crankshaft of an engine turns.

tack. Stickiness, as of a painted, varnished, oiled, or inked surface partly dried. Adhesiveness possessed by a printing ink, due to the use of a stiff varnish.

tack (nav) 1 To go about. Tiller down (helm alee) causing the boat's head to swing through the wind, and the sails to fill on the opposite side. 2. One leg of the zigzag course steered in beating to windward.

tacking iron (phot) A hot iron, generally heated by electricity, used in the dry mounting of prints.

tack weld. A weld used for assembly purposes only

tacky. Said of the condition of a printing roller when it has the right degree of stickiness to take up and carry ink. Pertaining to the degree of adhesiveness of any sticky substance.

tag locks (text) The dirty, stained portions around the edges of a fleece

tail boom (aer) A spar or outrigger connecting the tail surfaces and the main supporting surfaces.

tail drag (aer) A movable or variable weight suspended from the after part of an airship moored to a mast, to aid in restraining the vertical and lateral motions of the stern of the airship

tailheavy (aer) The condition of an airplane in which the tail tends to sink when the longitudinal control is released in any given attitude of normal flight (cf. noseheavy)

tailless airplane (aer) An airplane in which the devices used to obtain stability and control are incorporated in the wing

tail light (aut) A lighting unit used to indicate the rear end of a vehicle by means of a ruby light.

tail shaft (ship) The aft section of the shaft which receives the propellers. Also called "propeller shaft"

tail skid (aer) A skid for supporting the tail of an airplane on the ground.

tail slide (aer) Rearward motion relative to the air of an aircraft in flight.

tail surface (aer) A stabilizing or control surface in the tail of an aircraft.

tail wheel (aer) A wheel used to support the tail of an airplane when on the ground. It may be steerable or nonsteerable, fixed or swiveling

take-off (aer) The act of beginning flight in which an airplane is accelerated from a state of rest to that of normal flight. In a more restricted sense, the final breaking of contact with the land or water

take-off distance (aer) The distance in which an airplane will finally break contact with the land or water starting from zero speed. Take-off distance is considered in a calm or at a specified wind velocity

take-off rating (aer) The maximum power output permissible incident to "take-off"—to get the plane into the air and up to a safe flying altitude.

take-off speed (aer) The air speed at which an airplane becomes entirely airborne.

talking key (tp) A key which when operated makes it possible for the person operating the key to converse on the circuit with which the contacts of the key are associated.

tamarack (*larix loricina*) Wood of this tree resists ground rot and is used for poles, fence posts, and railroad ties Wt. 37 lbs per cu. ft. (air-dried) Maximum crushing strength 7,590 lbs. per sq. in. Shearing strength parallel to grain 1,370 lbs per sq. in

tamping (foundry) 1 Ramming sand around a pattern in a mold. 2. Stopping up the tap hole of a furnace with clay.

tang (mach). The narrow portion of a file which engages the handle

tank (el). A lead container usually supported by wood, for the element and electrolyte of a storage cell. This is restricted to some relatively large types of lead acid cells

tanker (ship) A vessel specially constructed and equipped with tanks for carrying liquids in bulk.

tanks (ship) In general there are two kinds first, those built in permanently as part of the ship's structure and used for the reception of water ballast, fuel, oil, or liquid cargo, second, those constructed specially and removable if necessary These vary greatly in shape, size, and the purpose for which they are used.

tank top (ship) The plating laid on the floors of a ship and forming the top side of the tank sections or double bottom.

tank vessel (ship). See tanker.

tap (in a transformer) (el) A connection brought out of a winding at some point between its extremities, usually to permit changing the voltage ratio

tap (mach) 1. A tool used for cutting inside or female threads in holes in metal, fiber, or other material. The two kinds in common use are standard hand taps and machine screw taps. 2. To cut threads inside of a hole.

tape (text). A narrow, woven fabric. Regarded by some as not over 8 inches in width.

taper (mach). To make gradually smaller toward one end, a gradual reduction of size in a given direction,

taper (of a file) Used to denote the shape of a file as distinguished from the Blunt. Custom has also established it as a short name for the Triangular Handsaw File. Graded variations are Slim Taper, Extra Slim Taper, and Double Extra Slim Taper,

taper in plan only (aer) A gradual change (usually a decrease) in the chord length along the wing span from the root to the tip with the wing sections remaining geometrically similar

taper in thickness ratio only (aer). A gradual change in the thickness ratio along the wing span with the chord remaining constant,

tappet (aut). That portion of a valve operating mechanism which rides against the cam and lifts the valve or push rod. It can usually be adjusted for valve stem clearance Also called "valve lifter"

tapping (metal) The operation of withdrawing the molten products from a furnace through an aperture.

tar. A thick, brown to black, viscous liquid obtained by distillation of wood, coal, peat, and other organic materials, and having a varied composition accord-

ing to the temperature and material employed in obtaining it. Soft pitch or thickened petroleum found in cavities of some limestones Loosely applied to any thick, sticky oil residue. In oil distillation the substance called tar is closely allied to fuel oil. It represents a strictly dry-run product, the intermediate from which paraffin distillate was distilled before the general adoption of tower stills.

target (el) An electrode, or part of an electrode, on which cathode rays are focused and from which x-rays are emitted.

target rod (surv) Consists of strips of grooved wood sliding one on another and a movable target. For short rod readings, the target is moved up or down the rod; for long rod readings, it is set at a stop near the upper end of one strip and clamped, and the strip bearing the target is raised to the required height. The rod reading is found on the side of the raised strip and opposite the vernier which is on the other strip, the scale reading downward.

tarpaulin (nav) A waterproof, fabric cover to keep stores dry while being transported.

taxi (aer) To operate an airplane under its own power, either on land or on water, except as necessarily involved in take-off or landing

taxiway (aer) A specially prepared area over which airplanes may taxi to and from the landing area of a landing field.

tearing strength (text) The ability of a material to resist division.

teazeling (text). See napping

technical sketching (draw) This type of drawing is accomplished freehand. Information from which the usual working drawing is to be made is frequently issued to the draftsman in the form of freehand sketches Also, the draftsman may find it advantageous to resort to freehand technical sketching when making a drawing of an object already in existence. A technical sketch properly dimensioned may serve as a working drawing in some instances.

technicolor process. A method of color photography used for making motion pictures in which the spectrum is divided in half so that the red hues are made to include the shades of orange and yellow, and the green hues the shades of blue and violet. A special camera takes two pictures at once by a system of prisms located behind the lens, one picture through a red filter and one through a green filter The films are then developed by a process similar to the black-and-white system, the work being done entirely by machinery

tee bar (ship) See tee iron.

tee iron (ship) Bar iron with a cross section like the letter "T"

tee joint (weld). A welded joint at the junction of two parts located approximately at right angles to each other in the form of a capital T

tee wind (aer) See wind.

telegraph channel. A path which is suitable for the transmission of telegraph signals between two telegraph stations The term "channel" is used to denote either a one-way channel providing transmission in one direction only or a two-way channel providing transmission in both directions. Three basically different kinds of telegraph channels used in providing a number of telegraph channels over a circuit are 1 One of a number of paths for simultaneous transmission in the same frequency range as in bridge duplex, differential duplex and quadruplex telegraphy 2 One of a number of paths for simultaneous transmission in different frequency ranges as in carrier telegraphy 3 One of a number of paths for successive transmission as in multiplex printing telegraphy Combinations of these types may be used on the same circuit.

telegraph key A hand-operated telegraph transmitter

telegraph sounder A telegraph receiving instrument by means of which Morse signals are interpreted orally, or "read", by noting the intervals of time between two diverse sounds

telegraph transmitter. A device for controlling a source of electric power so as to form telegraph signals.

telemeter. See *electric telemeter.*

telephone channel A path suitable for the transmission of voice-controlled electric waves between two stations. The term "channel" is used to denote either a "one-way channel" providing transmission in one direction only or a "two-way channel" providing transmission in both directions.

telephone connection. A two-way telephone channel completed between two points by means of suitable switching apparatus and arranged for the transmission of telephone currents, together with the associated arrangements for its functioning with the other parts of a telephone system in switching and signaling operations. The term is also sometimes used to mean a two-way telephone channel permanently established between two telephone stations.

telephone exchange. A telephone system for providing telephone communication within a particular local area, usually within or embracing a city, town or village, and environs.

telephone operator A person who handles switching and signaling operations to establish telephone connections between stations or who performs various auxiliary functions associated therewith. An operator at a private branch exchange is called an "attendant."

telephone repeater A combination of one or more amplifiers together with their associated equipment for use in a telephone circuit.

telephone switchboard. A switchboard for interconnecting telephone lines and associated circuits

telephone transmitter. A device whereby sound waves produce substantially equivalent electric waves.

telephoto. A photograph made with a telephoto camera and telephoto lens, producing large images of distant objects.

telephoto lens (phot) Telephoto lenses are either negative-lens attachments for use with ordinary positive lenses, or complete lens systems designed to give large images with relatively short bellows extensions, the size of the image varying according to the separation of the lens. They are used to make photographs of distant objects

telescope slides (surv) To assist in focusing the objective for different distances, the object glass is fastened in a tube which slides, with a rack and pinion, into one end of the main tube of the telescope. It is important that the slide be straight and fit snugly To facilitate the focusing of the eyepiece upon the cross hairs, a pin moves in a helical slot and the eyepiece is moved in and out by hand, with a screwlike motion.

television. The electric transmission and reception of transient visual images, in such a way as to give a substantially continuous and simultaneous reproduction to the eye at a distance.

temper (metal) A term used to indicate the percentage of carbon in steel, hence its toughness or hardness

temperature detector Any instrument which may be used to measure the temperature of a body or of some particular part of a body. A temperature detector may employ any physical property that is dependent on temperature. The most commonly used properties are: differential expansion of two bodies, thermoelectromotive force at the junction of two metals, change of resistance of a metal, and radiation from a hot body

tempering (metal). A method of removing the brittleness and internal strain resulting from hardening a metal by quenching It is essentially a re-heating process, either in air or in a liquid.

template (mach) A gage, pattern, or mold, commonly a thin plate or board, used as a guide to form the work being shaped.

template (c.h p). Patterns made in the mold loft from wood strips, cardboard or heavy paper

tender (text) A mill expression, meaning to weaken when used in connection with the injurious effect of chemicals on a fabric.

tensile compressive or shearing strength (StM) Maximum stress developed in the material during test, load being referred to the original cross-section.

tensile strength (StM) The tensile strength of a material is its resistance to a force which tends to pull it apart. Tensile strength is measured in pounds per square inch and is calculated by dividing the load in pounds required to pull the material apart by its cross-sectional area (in square inches)

tensile strength (text) The breaking strength of a material expressed in force per unit cross-sectional area of the original specimen or its equivalent.

tension. A stress or strain caused by pulling

tentering (text) A machine which grips the fabric at the selvages and pulls it to the desired width

term (alg) See monomial.

terminal board (el) An insulating base or slab, usually mounted in the rear of a switchboard panel, equipped with terminals for connecting the small wiring to the outgoing instrument and control cables.

terminal connector (el) A connector for attaching a conductor to a lead, terminal block or stud of electric apparatus

terminal posts (el) The points of the storage battery to which the external circuit is connected

terminals (el) The terminals of a battery are the parts to which the external electric circuit is connected. Also called "terminal posts"

terminal screw (el) See binding screw.

terminal velocity (aer) The hypothetical maximum speed that an airplane could attain along a specified straight flight path under given conditions of weight and propeller operation, if diving an unlimited distance in air of specified uniform density If the term is not qualified, a vertical path angle, normal gross weight, zero thrust, and standard sea-level air density are assumed

termites (lumber) Termites are not true ants, although they look much like them and live like them, in large colonies The winged male and female may be seen swarming in the spring or fall on their way to start new colonies Otherwise they are very seldom seen, as they stay in the earth or in wood. They damage rafters, joists, beams, or other timber of buildings, the inside may be entirely eaten out before the damage is noticed as they leave an outer shell of wood

ternary compound (chem) A combination of three different elements.

terpineol (chem) A mixture of several isomers used as a denaturant of fats in soap manufacturing

terra cotta (bldg) A coarse clay or plastic earth which is baked and then utilized for decorative purposes

terry cloth (text) A cotton or linen (rare) fabric with a looped pile on both sides. Heavier weights are called turkish towling and are used for towels, bathrobes, slippers, and draperies

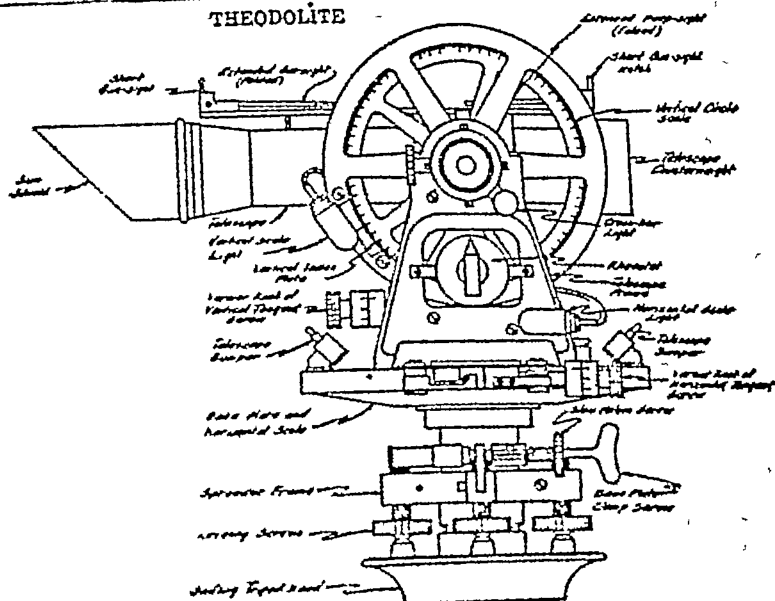
test cap (el) A protective structure which is placed over the exposed end of a cable to seal the sheath or other covering completely against the entrance of dirt, moisture, air, or other foreign substances Test caps are often provided with facilities for vacuum treatment, oil filling or other special field operations.

test chamber (aer) See experiment chamber

test strips (phot) Strips cut from a sheet of photographic paper and used until the exact printing time of a negative is determined.

tetraethyl lead See ethyl.

tetrode (rad) A four electrode vacuum tube containing an anode, a cathode, a control electrode and one additional electrode ordinarily in the nature of a grid.



thawing tank (refrigeration) The container in which ice blocks are loosened from the ice cans by means of water slightly warmer than the ice. Sometimes called "dip tank."

T-head (aut) A term applied to a type of engine and referring to the arrangement of the valves relative to the cylinders. The inlet valves at one side and the exhaust valves on the other side of the cylinder form the horizontal line, and the cylinder itself the vertical line of a T.

theodolite (surv) See direction theodolite, repeating theodolite.

theoretical throat of fillet weld. The distance from the root to the hypotenuse of the largest isosceles right triangle that can be inscribed within the weld cross section.

therm. A unit of heat equal to 100,000 Btu (British thermal units).

thermal cutout (el) An overcurrent protective device which contains a heater element in addition to and affecting a fusible member which opens the circuit.

thermionic emission (el). Electron or ion emission due directly to the temperature of the emitter, the rate of emission increasing rapidly with increase in temperature. Also called "Edison effect" and "Richardson effect."

thermionic tube (el). A vacuum tube in which one of the electrodes is heated for the purpose of causing electron or ion emission from that electrode.

thermit. A trade name for a mixture of powdered aluminum and a metallic oxide, as iron, chromium, or manganese oxide. Used in the Thermit Welding Process.

thermit crucible (weld) The vessel in which the thermit reaction takes place.

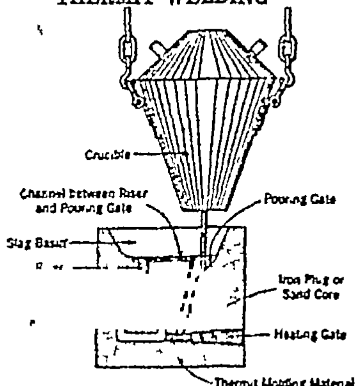
thermit mixture (weld) A mixture of [illegible] [illegible], alloying metals and mild steel

thermit mold (weld) A mold formed around the parts to be welded, to receive the molten metal.

thermit reaction (weld) A chemical reaction between iron oxide and aluminum which produces a highly superheated liquid iron and aluminum oxide slag

thermit welding A non-pressure (fusion) welding process wherein the heat is obtained from liquid steel produced by a thermit reaction, and the filler metal is supplied by the steel produced in this reaction

THERMIT WELDING



(Courtesy American Welding Society)

thermocouple (el) A pair of dissimilar conductors so joined as to produce a thermoelectric effect.

thermocouple instrument (el) An instrument in which one or more thermojunctions are heated directly or indirectly by an electric current, and supply a direct current which flows through the coil of a suitable direct-current mechanism, such as one of the permanent-magnet moving-coil type

thermocouple thermometer (el) A device for measuring temperature which depends upon the variation of the contact electromotive force between two different metals or alloys with temperature. A thermocouple consists of a conductor of one metal or alloy which has attached to each end a conductor of a second metal or alloy for connecting to a measuring instrument, the arrangement being such that one of the junctions between the metals can be placed at the point where the temperature is to be measured and the second kept at a known temperature.

thermodynamic function. See entropy.

thermodynamics. The theory of changing heat into mechanical work

thermoelectric effect. An electromotive force results from a difference of temperature between two junctions of dissimilar metals in the same circuit. Also called "Seebeck effect."

thermoelement (el) A device consisting of a thermocouple and a heating element arranged for measuring small currents.

thermograph (met) A recording thermometer

thermojunction (el) The point of contact of a pair of conductors forming a thermocouple

thermopile (el) A group of thermocouples assembled so as to act jointly as a source of electric energy.

thermosetting See plastics.

thermoplastic See plastics.

thermostat. An automatic device for regulating temperatures.

thermostress (weld) Stress produced in a structure or member caused by differences in temperature or coefficients of expansion

thickness gage (mach) A gage very commonly used in automotive work for measuring the distance between two surfaces, as for example, the clearance of valve tappets It consists of several strips of metal of regularly varying degrees of thickness, joined at one end, and opening out like a fan.

thickness ratio (aer) The ratio of the maximum thickness of an airfoil section to its chord.

THICKNESS GAGE



(Courtesy, L. S. Starrett Co.)

thief (rigging) A knot commonly mistaken for a reef knot, differing in that the end of each rope turns around the standing part instead of around the end of the other rope.

Thiokol (chem) Trade name for a series of synthetic organic polysulphide rubbers which can be vulcanized. It is claimed that these rubber materials possess excellent heat resistance, good processing characteristics, low permeability and high oil resistance. Used for hose, packing, printing plates, printing rollers, gaskets, self-sealing tanks, etc.

third rail (RR) A contact rail placed at either side of the track, the contact surface of which is customarily a few inches above the level of the top of the track rails.

third rail clearance line (RR) The third-rail clearance line of a railroad is the contour which embraces all cross sections of the third-rail and its insulators, supports and guards located at an elevation higher than the top of the track rail.

thole pin (naut) A pin fitted in the gunwale of a boat for use in place of a rowlock. [illegible] about 5 inches [illegible] a tholepin grommet.

Thomson effect (el) When a current flows from a hotter to a colder portion of a conductor heat is liberated or absorbed depending on the material of which the conductor is made. A more general statement is The heat liberated by a current in a conductor in which there is a temperature gradient depends upon the direction of the current with respect to the direction of the temperature gradient.

threads (mech). Helical ridges cut into screws, nuts, bolts, or the walls of a hole, so that the action of turning the screw, nut, or bolt, gives it endwise as well as rotary motion Although there are many types of threads, only two, National Coarse (N C) and National Fine (N F), are commonly used in motor vehicle work. N C. threads range from 64 to 6 threads per inch, N F from 80 to 12 per inch Any type of thread is either an outside (or male) thread as the threads on a bolt or screw or an inside (or female) thread, as in a nut or inside a hole.

three-color printing The process of reproducing a picture or drawing in many colors photomechanically with three separate printing plates, each plate being used for a different color, that is, one of the three primary colors red, yellow, or blue

three point landing (aer) A landing condition for the fuselage and landing gear, representing landing with the wheels and tail skid or wheel touching the ground simultaneously (cf. level landing)

three-quarter floating axle (aut) Inner ends of shafts carried as in a semi-floating axle Outer ends supported by wheels, which depend on shafts for alignment. Only one bearing is used in each wheel hub The three-quarter floating axle shaft carries torsion and the bending moment imposed by the wheel on corners and [illegible] on road surfaces It also carries tension and compression if the wheel bearings are not arranged to take thrust.

three square (mach). A file whose cross-section is triangular, [illegible] when such file is [illegible].

threshold (carp) The beveled piece over which the door swings, sometimes called a carpet strip

throat (nav). The forward, upper corner of the quadrilateral fore-and-aft sail in a sloop rig, also called the knock.

throat depth (weld) The distance from the center line of the electrodes to the first obstruction limiting the insertion of the work, usually measured in a horizontal plane.

throat of fillet weld (actual throat) The distance from the root to the face of the weld.

throat opening (weld) The variable dimension between the inner surfaces of current carrying members (arms, knees, or platens, etc.) taken at right angles to the measurement of throat depth.

throttle (aut) The knob on the dashboard or the hand lever on the steering wheel controlling the throttle valve of the carburetor and governing the admission of gas to the cylinders.

throw (eccentric) (mach) A crank, a crank arm, the radius of a crank or the crank radius of an eccentric, cam or the like. See also crank pin.

thrum mats (ship). Mats made of a small piece of canvas, with short strands of rope yarn sewed on them, called "thrumming" These are placed between the rowlocks and the oars to prevent noise in pulling.

thrust. A stress or strain caused by pushing.

thrust face (aer). See blade face.

ticking (text) A strong twilled cotton fabric with yarn dyed lengthwise in stripes of blue, red, brown, etc., with white Used for pillows and mattresses

tie beam (bldg) A beam so situated that it ties the principal rafters of a roof together and prevents them from thrusting the plate out of line. Also called "collar beam"

tie wire (el) An auxiliary wire used to attach a conductor to an insulator

tight (used as a suffix) Apparatus is designated as watertight, dust-tight, etc., when so constructed that the enclosing case will exclude the specified material.

tiller (ship) A bar or lever, fitted fore and aft in the rudder head, by which the rudder is moved.

timber (bldg) Lumber with cross section over 4" x 6", such as posts, sills, and girders.

time. Continuous existence as indicated by some sequence of events, such as the hours indicated by a clock or the rotation of the earth about its axis, the experience of duration or succession. See "mean solar time," "sidereal time", "standard time."

time rating (el) The period of a test run within which the specified conditions of load and temperature rise shall not be exceeded.

tin (Sn). A soft white ductile metal in the pure state. It is widely used for coating metal because it does not readily oxidize at ordinary temperatures. At. wt. 118.70, at. no 50, m p 231 9° C., sp. gr. crystalline 7.2, amorphous 5.8.

tin shingle (bldg) A small piece of tin used in flashing and repairing a shingle roof.

tinsmith. One who makes containers and implements out of tin. The work also includes the construction of sheet metal works, ventilators, furnace ducts, etc

tint (art). A degree of any color lighter than normal, as when white is added; when the color is darkened by adding black, it is a shade

tint block (print) An engraved, grained, or flat plate or electrode for printing a faint color, either as a background or to fill panels of other parts of a design.

tip (tp) The tip of a plug is the contacting part at the end of the plug

tipping brackets (ship). Flat bar or plate brackets placed at various points on deck girders beams, stiffeners, or longitudinals as reinforcement.

tip radius (aer) The distance of the outermost point of a propeller blade from the axis of rotation. Also called "propeller radius."

titanium (Ti) A rare metal always found in the combined state. Used in certain metal alloys. At. wt. 47.90, at. no. 22, m.p. 1800° C., sp. gr. 3.54.

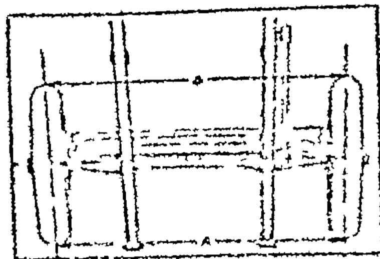
titre (chem) In general the amount of one substance required to react with a given volume of another substance, as the amount of acid required to neutralize a definite amount of base. In the analysis of fats and oils, the titre refers to the temperature at which the fatty acids obtained by alkaline hydrolysis of the fat, resolidify.

T joint (el) See branch joint.

Tobin bronze (metal) Tobin bronze is very similar to Naval brass in composition. Its distinctive properties are due to rolling and annealing. It may be regarded as having the strength and ductility of structural steel besides being noncorrosive. It is readily hot-worked and machined, and is used for turnbuckles, fittings, etc.

toe (ship) The edge of a flange on a bar.

toe-in (aut) The degree (usually expressed in fractions of an inch) to which the forward part of the front wheels are closer together than the rear part, measured at hub height with the wheels in the normal "straight ahead" position of the steering gear.



(Courtesy, General Motors Corporation)

toe of weld The junction between the face of the weld and the base metal.

tolerance (mach) An allowable variation in dimensions. For example: A standard measurement of .025 with a tolerance of minus .003 or plus .003 indicates that dimensions between .022 and .028 are allowable.

toll office (tp). A central office primarily arranged for terminating toll lines, toll switching trunks, recording trunks and recording-completing trunks and for their interconnection with each other as necessary for the purpose of establishing connections over toll lines.

tone (phot) The shade, hue or degree of color prevailing in a negative or print. Also depth or intensity of any part of the photograph.

tongue (ship) The tongue of a stern post or propeller post is the raised middle section which is fastened to the vertical keel. As a rule the tongue is raised twice as high as the sides of the dished keel.

tonnage (nav) A measure of a vessel's interior volume. The number of hundreds of cubic feet space in a vessel, less certain deductions such as crew and space for ship machinery. The cubic space in feet available for freight and passengers divided by 100, is the net tonnage. There is no general standard for the term "tonnage." See also deadweight tonnage, displacement tonnage, gross tonnage.

tonneau light (aut). A lighting unit mounted back of the front seat in open or closed vehicles.

ton of refrigeration The removal of 200 Btu of heat per minute.

tooling To re-engrave or touch up parts of an engraving with a hand tool. To embellish a book cover by means of small hand tools.

toolmaker (mach). A [illegible] who specializes in [illegible] cutting tools, jigs and gages.

tooth 1 On paper, that quality or texture on its surface which causes it to easily take ink or other marks, also called "bite" 2. On photographic negatives, a fine varnish put on the film to give the "tooth" needed to take the marks of a pencil for retouching

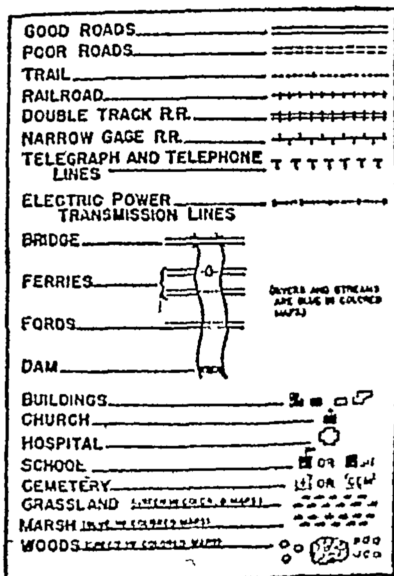
top (text) The large, soft balls of combed wool fiber

top dead center (aut) The point which the piston reaches at the top of its stroke. Also called "upper dead center"

toplight (aer) A supplementary position light designed to be used on marine aircraft while on the water

topography Study of the earth's surface formations such as hills, valleys, etc. 1 The configuration of the earth's surface including relief, drainage, culture, etc.

TOPOGRAPHICAL SIGNS



(Courtesy, The Infantry Journal)

2. The science of surveying the physical features of a district or region and the art of delineating them on maps 3 The physical features of a district or region such as are represented on maps and taken collectively, especially the relief and contour of the land.

topping (text) A tinting of a dyed fabric by running it into a bath of a different color

topping lift (ship) A line used for supporting or hauling up the boom of a fore-and-aft sail

top wool (text) A continuous, untwisted strand of wool fibers, from which the shorter fibers or noils have been removed by combing

torch (weld) See cutting torch, welding torch.

tornado (met) A violent funnel shaped wind whose velocities exceed 100 MPH, blowing counter-clockwise over a small area.

torque (mech) A twisting or wrenching effort. Torque is the product of force multiplied by the distance from the center of rotation at which it is exerted. For example A force of 40 pounds applied on the end of a 1-foot pipe wrench would be 40 pounds x 1 foot, or 40 foot-pounds of torque. Similarly, 40 pounds of force exerted on the end of a 2-foot pipe wrench would be 40 pounds x 2 feet, or 80 foot-pounds of torque This indicates why it is easier to unscrew a pipe coupling with the 2-foot wrench than the 1-foot wrench—the torque incident to the 2 foot lever (wrench) is greater

torque arm (aut) Sometimes called the torque rod, this part of a motor vehicle connects the rear-axle housing with the transmission case, and prevents the axle-housing from twisting when the power or brakes are applied.

torque stand (aer) A test stand on which the engine torque is measured

torque tube (aut) A tubular member rigidly attached to the rear axle housing and enclosing the propeller shaft, which

is also attached to the frame or transmission and prevents movement of the axle housing through drive torque reactions.

torsion. The deformation in a body caused by twisting

torsional strength (StM) Torsion is a twisting force such as would occur in a member fixed at one end and twisted at the other The torsional strength of a material is its resistance to twisting or torsion. (modulus of rupture in torsion) Maximum stress in the extreme fiber of a specimen tested to rupture as computed by the application of the torsional formula to stresses above the torsional proportional limit. For a round specimen it equals

$$S = \frac{5.1 \times \text{twisting moment}}{\text{diameter}^3}$$

In ductile materials the stress at rupture may be considered uniformly distributed over the cross-sectional area and the above formula assumes the form

$$S = \frac{3.82 \times \text{twisting moment}}{\text{diameter}^3}$$

total base (chem) The analytical value for the sum of the positive elements, Na, K, Ca, Mg, total mineral cationogens, sometimes called fixed base.

to the weather (bldg) A term applied to the projecting of shingles or siding beyond the course above

tough materials (StM) Those which will withstand heavy shocks or will absorb a large amount of energy

toughness (StM) A material which possesses toughness will withstand tearing or shearing and may be stretched or otherwise deformed without fracturing

touring car (aut) Generally longer bodies than the phaeton, permitting the use of auxiliary seats in the tonneau for the accommodation of additional passengers In other respects similar to the phaeton.

tower loading (ct) The load placed on a tower by its own weight, the weight of the wires with or without ice covering [illegible] the wind pressure normal to the line acting both on the tower and the wires and the pull from the wires in the direction of the line

towing basin (aer) See seaplane tank.

towing bitt (ship) Often called towing post. A vertical timber securely fastened for use in towing or mooring

towing sleeve (aer) A tubular fabric envelope towed by an aircraft and used as a target.

tracing paper (draw) Paper rendered transparent for tracing purposes by being soaked in a solution containing a mixture of Canada balsam, turpentine, and a trace of vegetable oil, and then hung up until dry

track (air nav) Actual path of an aircraft over the surface of the earth. Track is the path that has been flown. Course (true) is the path intended to be flown

track (aut) The distance between two wheels, measured parallel to the axle. Also called the "tread."

track (tractor) An endless belt device with metal, rubber or processed blocks, or metal links driven by sprockets and guided by rollers

track braking (RR) A system of braking in which a shoe or slipper is applied to the track rails by mechanical, pneumatic or magnetic means.

track circuit (RR) An electric circuit of which the rails of the track form a part.

track indicator chart (RR) A map-like reproduction of railway tracks controlled by track circuits so arranged as to indicate automatically for different sections of track whether or not such sections are occupied

track instrument (RR) A device in which the vertical movement of the rail or the blow of the wheel operates a contact to open or close an electric circuit.

track return circuit (RR) A type of electric power distribution circuit for rail traction, wherein the track is included as a portion of the circuit.

tractive effort. The total propelling force measured at the rims of the driving wheels When the term "tractive effort" is used, it is commonly preceded by one of the following limiting words "maximum start," "one-hour," or "continuous."

tractor (aut) A vehicle designed primarily for towing It may be full or half track laying, convertible, or wheeled.

tractor airplane (aer). An airplane with the propeller or propellers forward of the main supporting surfaces

tractor propeller (aer). A propeller mounted on the forward end of the engine or propeller shaft.

trade-mark. 1. In typography a peculiar distinguishing mark or design placed somewhere on business or commercial printed matter. Trade-marks may be copyrighted and the exclusive right to their use in them recognized by law 2. Any mark or device affixed by a merchant or manufacturer to his goods intended to identify, advertize, or distinguish them from goods of another business house.

traffic-control projector (aer) A projector designed to give light signals to an aircraft pilot.

trailer (aut) A wheeled vehicle without motive power, but provided with suitable drawbars or tongues for attaching it to a truck or other towing vehicle.

trailing control surface area The area of a trailing control surface is the area of the actual outline projected on the plane of the surface, except that any portion of the movable surface lying forward of the hinge axis and within the fixed surface is included in the fixed surface Auxiliary or paddle-type balance surfaces shielded by and lying outside of the fixed surface are not included in the area of either the fixed or the movable surfaces.

trailing edge (aer) The rearmost edge of an airfoil or of a propeller blade.

trail rope (aer). See drag rope.

train describer (RR) An instrument used to give information regarding the origin, destination, class or character of trains, engines or cars moving or to be moved between given points

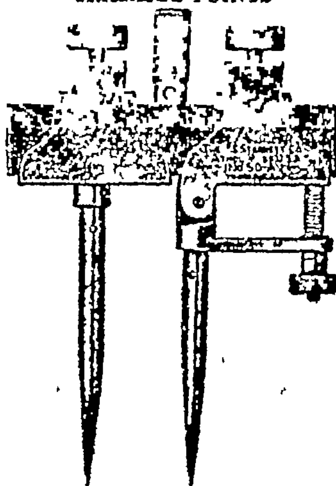
train resistance. The sum of frictional and atmospheric forces which resist vehicle or train movement, with the exception of the resistance due to grades and curves

trajectory band (aer) A band of webbing carried in a special curve over the surface of the envelope of an airship to distribute the stresses due to the suspension of the car

trammel (aut) A stationary reference point for adjusting or checking valve timing, generally marked on the flywheel.

trammel (mach) A tool used to measure the distance between points too great to be reached with ordinary dividers.

TRAMMEL POINTS



(Courtesy, L. S. Starrett Co.)

transconductance (rad) Transconductance from one electrode to another is the quotient of the in-phase component of the alternating current of the second elec-

trode by the alternating voltage of the first electrode, all other electrode voltages being maintained constant. As most precisely used, the term refers to infinitesimal amplitudes.

transducer (rad) A device by means of which energy may flow from one or more transmission systems to one or more other transmission systems. The energy transmitted by these systems may be of any form (for example, it may be electric, mechanical or acoustical) and it may be of the same form or different forms in the various input and output systems

transfer (print) To take an impression of a form, plate, or drawing and transfer it mechanically to another plate or flat surface. In lithography, the sheet or gelatine like film containing the design that is to be transferred to a printing surface, either metal or stone

transfer case (aut) Heavy duty vehicles require a greater selection of gear changes than the transmission normally affords in order to meet power requirements ranging from a no load condition on level highways to a full load condition on steep hills or rough terrain. In order to meet these exceptional requirements an extra gear case, usually known as an auxiliary transmission, is used between the regular transmission and the driven axle to provide additional gear changes. The transfer mechanism or case, usually located off center with relation to the engine and transmission provides the means of driving both front and rear axles. A declutching device to disconnect the front driven axle is usually included.

transformer (el) An electric device without continuously moving parts which by electromagnetic induction transforms electric energy from one or more circuits to one or more other circuits at the same frequency, usually with changed values of voltage and current.

transformer vault (el) An isolated enclosure either above or below ground [illegible] with fire-resisting walls, ceiling and floor for unattended transformers and their auxiliaries.

transit (surv) An instrument used for measuring horizontal and vertical angles, for measuring distances by the stadia, and for leveling. The transit consists of a telescope attached to a vernier which may be moved around a graduated circle. There are suitable attachments for controlling the motion of the telescope and the vernier, and for enabling the graduated circle to be made horizontal. Illustration, p 310

transit strip (aer) A section of the landing area adjacent to a runway or other hard surfaced area, constructed of crushed stone, or other suitable material, properly bound, to insure the safe landing and taxying of airplanes across such a runway or area in any direction.

translatory resistance derivatives (aer) Resistance derivatives expressing the variation of moments and forces due to small changes in the translational velocities of the aircraft.

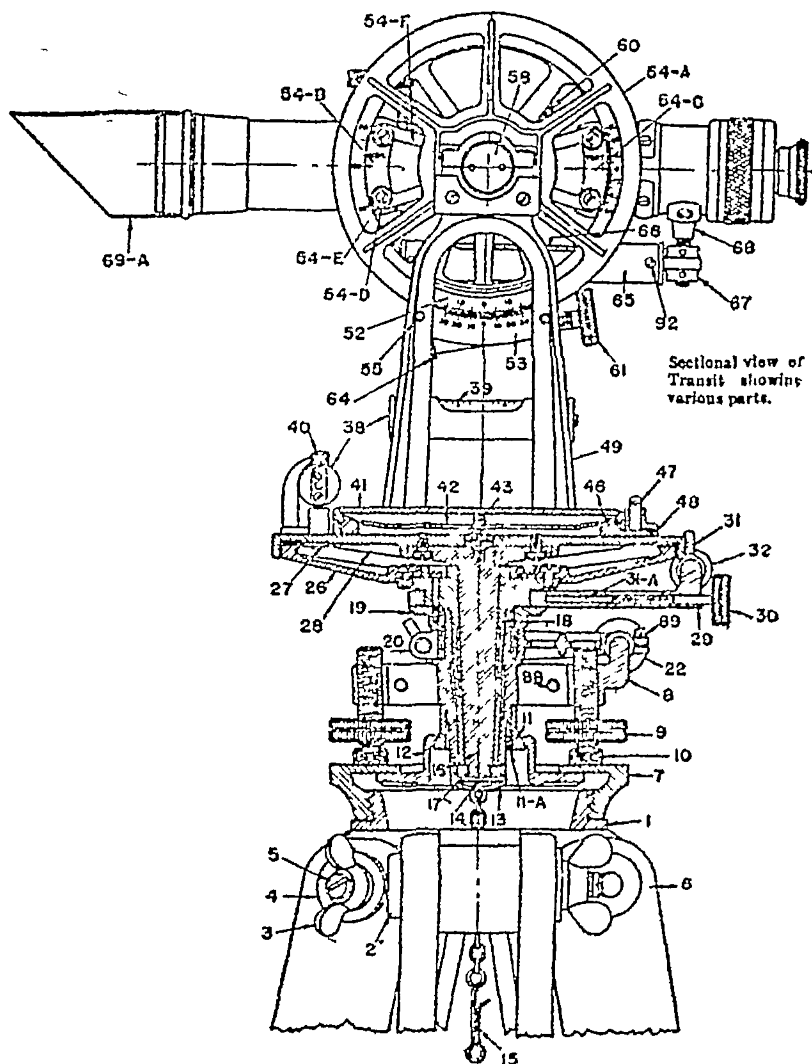
translucent. Permitting the passage of light partially.

transmission (aut) That part of a power unit which transmits power from the engine to the driving wheels through a system of speed-changing gears.

transmission mechanism (aut) The power requirements of a motor vehicle vary with the speeds of the vehicle, road conditions, and loads. Since an engine develops only a small fraction of its total power at low speed (revolutions per minute) it is necessary for starting and for the lower speeds of vehicle movement to provide a variable gear ratio by means of different transmission gear combinations. It is common practice to provide at least three forward gear (speed) changes on passenger cars, plus neutral and reverse positions, and as many as five or more forward changes on trucks.

transmission network (el). A group of interconnected transmission lines or feeders.

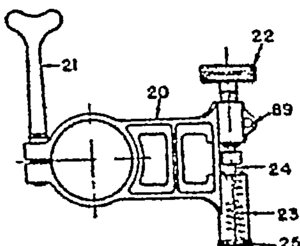
transom frame (ship) The last transverse frame of a ship structure. The cant frames, usually normal to the round of the stern, [illegible]

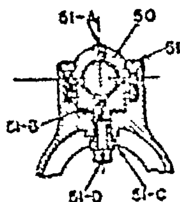


Sectional view of Transit showing various parts.

(Illustration Copyright Keuffel & Esser Co.)

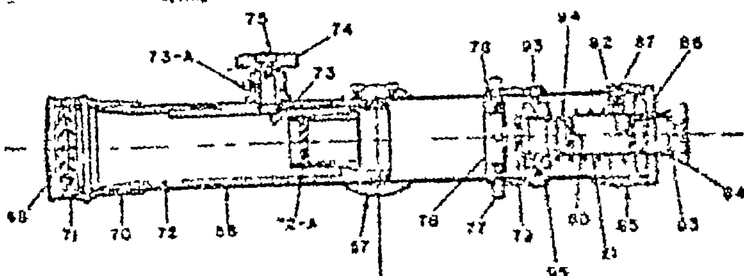
1 Tripod head
2 " bolt
3 " " nut
4 " " washer
5 " " lock screw
6 " leg
7 " plate
8 Leveling head
9 " screw
10 " " shoe
11 Half ball
11-A " " lock screw
12 Shifting plate
13 Center cap
14 " spring
15 Plumb bob chain & hook
16 Inner center
17 Center nut
18 Outer center
19 Clamp collar
20 Lower clamp
21 " " screw
22 " " tang. screw
23 " " spring
24 " " plunger
25 " " cap
26 Horizontal limb
27 Vernier
28 " plate
29 " " clamp
30 " " " screw
31 Vernier plate clamp spring box
31-A Vernier plate clamp plunger pin
32 " plate clamp tang. screw
33 " plate clamp plunger
34 " plate clamp spring





35 Vernier plate clamp cap
36 Vernier cover glass
37 " " frame
37-1 " reflector
37-2 " " hinges

38 Vernier plate level
39 " " vial
40 " " " adjusting screw
41 Compass cover glass
42 " needle
43 " " cap
44 " " lifter
45 Compass needle lifter screw
46 " ring
47 " " variation pinion
48 " " " housing
49 Standard
50 " cap
51 " " screw
51-A Axle friction screw
51-B " bearing block
51-C " " adjusting screw
51-D " bearing block lock screw
52 Vertical circle
53 " " vernier
54-A " " guard
54-B Stadia index bar
54-C " " vert.
54-D " " lock screw
54-E " " adjust
54-F " " frame
55 Vernier post and nut
56 Telescope tube
57 Telescope axle
58 " " end cap
59 " " clamp
60 " " screw
61 " " tang. screw
62 " " spring
63 " " plunger
64 " " cap
65 " level



transom plate (ship) The plate between the fantail and the hull.

transoms (nav) Pieces of timber going across the sternpost, to which they are bolted. Raised platforms in small vessels and yachts, officer's quarters, etc., and used for seats.

transparency (phot) A transparent plate having a positive image. Lantern slides are examples of transparencies made to fit stereopticons or projectors

transparent. Permitting the passage of light fully and freely. Opposed to opaque.

transparent glass. Glass having no apparent diffusing properties. Varieties of such glass are sometimes referred to as flint, crystal, clear.

transposition (alg). The transferring of terms from one side to an equation to the other The sign of the terms transferred must be changed.

transrectifier (rad) A device, ordinarily a vacuum tube, in which rectification occurs in one electrode circuit when an alternating voltage is applied to another electrode.

transverse (aer) See intermediate transverse, main transverse.

transverse (ship) Any transverse member placed at right angles to the keel, such as a transverse frame, transverse bulkhead, etc. See also abeam and athwart.

transverse bulkhead (ship). A partition wall of plating running in an athwartship direction across a portion of the whole breadth of a ship.

transverse feed (mach) See crossfeed.

trapezoid (geom) A quadrilateral having only two parallel sides.

traveler (ship). A metal rod on the stern to carry the main sheet block.

traveling wave (el). The resulting wave when the electric variation in a circuit takes the form of translation of energy along a conductor, such energy being always equally divided between current and potential forms.

traverse (mach) A lateral or crosswise movement as of the saddle of a lathe carriage, usually applied to the movement of a cutting tool or grinding wheel across the work, or to the movement of the work across the cutting tool or grinding wheel.

traverse (surv) A series of consecutive courses of which the lengths and relative angles have been determined, thereby locating the stations with respect to each other A traverse which comes back to the starting point is called a closed traverse.

tray (el) A support or container for one or more storage cells.

tread (aut) See track.

tread (carp) The horizontal part of a step.

treadle (mach). A foot lever by which a machine may be operated.

treadles (text) See pedals.

trestle (engr) An intermediate transverse support consisting of a framework of horizontal and vertical members, usually requiring external bracing for stability. Also called "bent" or "trestle bent"

triangles (draw) Triangles commonly used in mechanical drawing are of two types, the 45 degree and the 30 degree to 60 degree, and are usually made of transparent celluloid. Triangles, in combination with the T-square, are used in the construction of vertical and inclined lines.

triangular scale (draw). The mechanical engineer's or architect's triangular scale is generally used in the preparation of mechanical drawings It has eleven sets of graduations or scales. At each end of the scales (except the full size scale) is a number indicating the size of the main divisions on that scale. Numbers (upright) at the right end are read to the left, and those (upright) at the left end are read to right. When a scale on the left end is used, foot measurements are read to the right of the zero point

and inch measurements are read to the left, conversely, when a scale on the right end is used.

triangulation (surv) See geodetic triangulation.

tricot (text) An old name for jersey cloth. A form of warp knitting

trigonometry The study of the ratios between the sides of a right triangle, the relations between these ratios, and their applications, especially in solving triangles (finding the remaining parts when a sufficient number are known) in surveying, range-finding, navigation, construction work, etc.

trim (carp) A term sometimes applied to outside or interior finished woodwork and the finish around openings.

trim (nav) The difference in draft, foreward and aft.

trim angle (aer) The angle between the horizontal and the longitudinal base line of a seaplane float or flying-boat hull. It is positive when the bow is higher than the stern.

trimmer (carp) The beam or floor joist into which a header is framed.

trimmer signal (RR) A signal which gives information to the engineman concerning movements to be made from the classification tracks into the switch and [illegible] area

trimming (b'dg) Putting the inside and outside finish and hardware upon a building.

trimming (phot) Cutting a print down to eliminate excessive margin or unwanted detail.

trimming board (phot). Consists of a board fitted with a pivoted cutting blade in close contact with a steel edge forming a border of the board. This edge is at right angles to a raised strip on the board against which the print is pressed.

trimming guides (phot) Two L-shaped pieces of cardboard placed over a print so as to form an adjustable square or rectangle. Used as an aid to determine the part of the image to be retained.

trimming moment (aer) The moment about a reference point, usually the center of gravity, exerted by the seaplane hull or float when held at a fixed trim angle. It is considered positive when the bow tends to rise.

trimming tanks (ship) Tanks at the extreme ends of a vessel. By filling or emptying one or the other, a ship may be easily trimmed by the head or stern as required. Also called "peak tanks."

trinomial (alg) An algebraic expression having three terms. For example, $x^2-2xy+5y^2$.

triode (rad) A three-electrode vacuum tube containing an anode, a cathode, and a control electrode

trip free in any position (el) A circuit breaker is trip free in any position when it is trip free at any part of the closing operation. If the tripping circuit is completed through an auxiliary switch, electrical tripping will not take place until such auxiliary switch is closed.

triple riveting (ship) Fastening by three rows of rivets.

triplex cable (el) A cable composed of three insulated single-conductor cables twisted together. They may or may not have a common insulating covering.

tripod (phot) Consists of three telescopic legs each movably attached to a base or tripod head upon which rests the camera.

tripping mechanism (el). An electrically or mechanically operated device which releases the holding means and permits the contacts of the circuit breaker to open.

trolley (RR). A current collector, commonly mounted on the top of the vehicle, the function of which is to make contact with a contact wire

trolley base (RR) That part of a pole trolley on which the trolley pole is mounted so pivoted as to permit of free horizontal movement, and which is provided with means whereby the current

collecting member is pressed against the contact wire.

trolley beam (ship). See strong beam.

trolley harp (RR) The member of a pole trolley which carries the trolley wheel or shoe.

trolley head (RR) A fitting, commonly used with a swivel harp, attached to the end of a trolley pole for carrying a trolley harp

trolley pole (RR) The member of a pole trolley, one end of which carries the collecting member, the other end being attached to the trolley base

trolley wheel (RR). The collecting member of a pole trolley which maintains a rolling contact with a contact wire

tropical air (met) Air whose origin was or is the tropical or subtropical zones.

tropopause (met). The boundary between the stratosphere and the troposphere

troposphere (met) That portion of the atmosphere lying between the earth and the stratosphere whose temperature lapse rate averages 3 5 F per 1000 ft.

troughing (el) An open channel of earthenware, wood, or other material in which a cable or cables may be laid and protected by a cover

truck. 1 Any motor vehicle used for transportation of heavy loads as distinguished from the passenger type of automobile. 2. The abbreviated term for "hand truck," generally a two-wheeled implement for local transportation of lighter loads in warehouses, stockrooms, etc. 3. The assembly of wheels, springs, and air brakes forming one unit of the running gear of a railroad car 4 A cap at the summit of a flagstaff or masthead.

truck plate (ship) A flat plate fitted to the stern post and flanged to take strakes of stern plating

truck-tractor (aut). A wheeled vehicle, equipped with a fifth wheel arrangement, desigcd for towing semitrailers.

true azimuth (surv) The true azimuth of a given line is the angle measured clockwise from true north to the given line.

true brasses (metal) The true brasses constitute those copper-zinc alloys in which the copper content is greater than 49 percent. The valuable alloys contain from 60 to 90 percent copper and 10 to 40 percent zinc. The brasses are stronger and more ductile than either of their constituents. They may be cast or wrought.

true watts (el) A term used to designate the average rate at which electric energy is delivered through the meter during a meter test, as indicated by standard instruments

trunk (tp) A telephone line or channel between two central offices or switching devices, which is used in providing telephone connections between subscribers generally

trunk transmission line (el) A transmission line acting as a source of main supply to a number of other transmission circuits

trunnion (aut) Either of two opposite pivots or cylindrical projections from the sides of a part or assembly, supported by bearings, to provide a means of swiveling or turning the part or assembly

trunnion axle (aut) A supporting axle, which carries a load with other axles attached to it. Its use as part of a "bogie" permits independent wheel action in a vertical plane and within designed limits.

truss (engr) A compound beam, the parts of which are arranged to form one or more triangles in the same plane, so that the beam will transmit roadway loads from the floor system to the abutments or to intermediate vertical supports called "panel points"

try square (carp-mach) A tool composed of a steel blade set at right angles into a head (beam) of wood or steel. The blade is graduated into inches and fractions of an inch. It is used to serve as a guide for the pencil in marking lines at

right angles to an edge or surface; to test an edge or end to determine whether it is square with the adjoining surface or edge, to test the surface or edge to determine whether it is the same thickness throughout its length.

T-square (draw) Generally consists of a wooden blade with transparent celluloid edges, securely fastened at right angles to a head by means of screws. The T-square is used for drawing horizontal lines and as a guide for drawing lines with triangles.

tube (el) 1. A hollow cylindrical piece of porcelain, usually unglazed, having a head or shoulder at one end through which an electric conductor is threaded when passing through a wall, floor, ceiling, joint, stud, etc. 2. A tube for a dry cell or battery is a cylindrical covering of insulating material, without closure at the bottom.

tube (rad) See thermionic tube vacuum tube.

tube (text) 1. A holder or bobbin of cylindrical shape used as a core for a yarn package of cylindrical form. 2. A cylindrical yarn package formed by winding on a tube.

tub sized (paper). Sized of paper that has been sized by passing through a tub or vat.

tumble home (ship) The distance the ship's side falls in towards the center line above the load water line. The opposite of "flare."

tuned transformer (el) A transformer the associated circuit elements of which are adjusted as a whole to be resonant at the frequency of the alternating current supplied to the primary, thereby causing the secondary voltage to build up to higher values than would otherwise be obtained.

tung oil (paint). A yellowish drying oil obtained from the seeds of [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

tungsten (W) A white metal in the pure state. Used in lamp filaments and in the manufacture of special steel. At. wt. 184.0, at. no 74, m.p 3400° C, sp gr 18.77

tuning (rad) The adjustment in relation to frequency of a circuit or system to secure optimum performance, commonly the adjustment of a circuit or circuits to resonance.

tunnel recess (ship). The elevated and extended after portion of a tunnel.

turbulent air (met). Air in chaotic motion. See rough air.

turbulent flow (aer). Any part of a fluid flow in which the velocity at a given point varies more or less rapidly in magnitude and direction with time.

turkish toweling (text). See terry cloth.

turn and bank indicator (aer) An instrument combining in one case a turn indicator and a lateral inclinometer.

turnbuckle. A device used to pull objects together. A link threaded on both ends of a short bar, one left-handed, the other right-handed.

turn indicator (aer) An instrument for indicating the existence and approximate magnitude of angular velocity about the normal axis of an aircraft.

turning radius (aut). The radius in which an automobile can turn. It is determined by the wheel base and the angle at which the front wheels can be turned.

turnmeter (aer) An instrument that measures the rate of turn of an aircraft about any predetermined axis.

turpentine (paint) Turpentine is a colorless volatile liquid obtained from the distillation of pine tree products. It is a complex mixture of terpene hydrocarbons. Used mainly in the paint and varnish industry, and also in the manufacture of shatter proof glass.

turtle back (ship) The top of a wheel house, forecastle, etc., having the form of a turtle's back.

tweed (text) A rough, coarse cloth made from woolen spun yarns, containing wiry and heavy wools. Stock or yarn dyed. Very durable. Used for coats and suitings. Weave is usually plain.

tween decks (ship). The space between any decks.

twill (text) A fundamental weave with many variations. Found in denims, serges, and Canton flannel.

twin cable (el) A cable composed of two insulated stranded conductors laid parallel, having a common covering

twist (text) The turns about its axis, per unit of length, observed in a fiber, yarn, or cord. Twist is expressed in turns per inch or per meter

twist drill (tool) A drill made either of carbon steel or high speed steel. The three principal parts of this type of drill are the body, shank, and point, and they are available with either two, three, or four flutes (the spiral grooves formed along the sides), but drills having three or four flutes are used for following smaller drills or for enlarging cored holes, and are not suitable for drilling into solid stock.

two-along (book). Two signatures sewed with fastening on alternate ends of the kettle stitch.

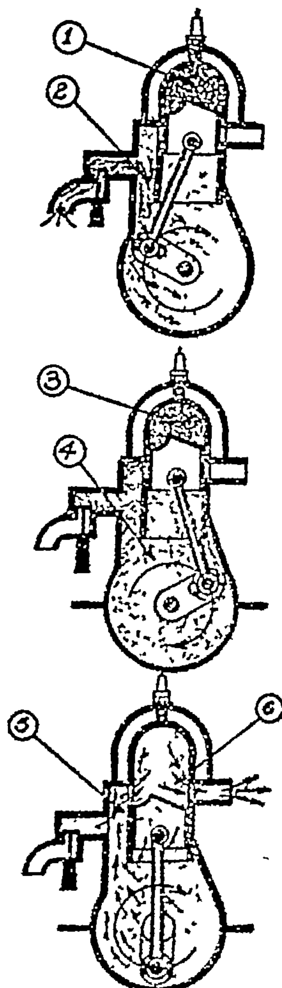
two-cycle engine (aut-nav). This type of engine combines the four actions of intake, exhaust, compression, and explosion, in two strokes of one cycle.

two-ply (text) A yarn or thread in which two strands or singles are twisted together

two-point drawings. Those in which the object to be drawn is viewed from an angle, and in which the two sets of horizontal lines meet at respective points on the horizon. Also called "angular perspective drawings."

two-point focusing (phot). An arrangement on some box cameras whereby there is one setting for near objects and one for distant objects.

Two-stroke cycle principle



1. Fresh gases being compressed.
2. Fresh gases entering crankcase
3. Gases burning in cylinder
4. Gases being compressed in crankcase
5. Fresh gases entering cylinder from crankcase
6. Burned gases leaving cylinder

two-stroke cycle (aut) See two-cycle engine.

two-wire circuit (tg-tp) A metallic circuit formed by two conductors insulated from each other. The term is also used in contrast with "four-wire circuit" to indicate a circuit using one line or channel for transmission of electric waves in both directions.

tying up (print). To bind together a page of composed type with a string.

tympan (print). The sheets of paper, card, cloth, or other material that cover the platen or cylinder of a press and on which the paper is placed to receive the impression, also a cloth-covered frame attached to the bed of a hand press. On a cylinder press this feature is usually termed the packing.

Tyndall beam (phy) The band of reflected light that is visible when a beam of light is passed through a medium containing dispersed particles capable of reflecting the light. Frequently an apparently homogeneous medium is shown to have dispersed particles by the use of this test. Also called Tyndall cone.

Tyndall meter (phy) An instrument for measuring the intensity of a Tyndall cone.

type (print) Printer's types are small pieces of metal each having a letter or other character in relief on one end. They are made of many sizes but all must be of exactly the same length, so that when they are assembled in lines with faces their faces will present a uniform plane surface to be printed from.

typefounding The casting or manufacture of printing type.

type-high (print) The height of type in America is .918 of an inch. Electros, engravings, and other forms to be printed on a typographic press should conform to the type-high standard. Type-high gages, useful articles in any composing room, are made in a number of styles.

type holder (print) A small tool for holding a few lines of type, for hand stamping, such as used by bookbinders for letter book covers, etc.

type measure (print) A strip of strong cardboard, wood, or steel, having its edges marked with scales indicating ems of type sizes. Usually only sizes up to pica or 12-point are given. Used for measuring composition.

type metal (print) Types are made from an alloy of lead, tin, antimony, and sometimes copper. A composition which, when melted, fills the mold exactly and shrinks very slightly in cooling, leaving a smooth, closely grained surface that is durable enough to give many impressions without breaking down.

typesetting machine (print). An apparatus for composing type mechanically instead of by hand. The term is loosely applied to all machines which produce composed reading matter. The simplest machine is a typesetting and distributing apparatus, the Monotype casts individual types and composes them in justified lines, the Linotype assembles matrices at the face of a mold and casts the complete line in one piece or slug.

typographer. A printer, specifically one who prints from movable types. Often abbreviated to "typo."

typography. The art or process of printing from movable types. Also called "letterpress printing."

U

ultimate load (stress analysis) The load that causes destructive failure in a member during a strength test, or the load that, according to computations, should cause destructive failure in the member

ultimate strength (StM). Ultimate strength is the term used to designate the highest unit stress that a member can sustain. This occurs at or just before failure or rupture of the material The ultimate strength of materials is the basis of structural-strength analysis.

ultracentrifuge (chem) A centrifuge having very high speed, and developing centrifugal forces as high as 7,000,000 times gravity

ultramarine A beautiful and durable sky-blue color made from the mineral lapis lazuli. Artificial ultramarine of commerce is made by grinding together and burning a mixture of clay, carbonate of soda, sulphur, rosin, etc

ultramicrons (chem) See submicrons.

ultramicroscope (chem-phy) A microscope, used largely in the study of colloids, where the source of light is a sharp beam at right angles to the line of vision. What is seen is not the particle itself, but the reflection of light from the particle.

ultrasonic waves (phy) Sound waves of a frequency too high to be audible

ultra speed welding A resistance welding process wherein two or welding electrodes are in simultaneous contact with the material to be welded with the welding current commutated successively between the welding electrodes by means of a commutating device in the second ary welding current circuit.

ultra-violet rays (phy) Invisible rays beyond the violet end of the solar spectrum, having a wavelength less than 4000 Angstrom units (approx.)

umbra (pl. umbrae) The part of the shadow of an object from which all direct light is excluded.

umbrella (ship) A metal shield in the form of a frustrum of a cone, fitted to *the outer casing of the smokestack over* the air casing to keep out the weather

unaffected zone (weld) That portion of the base metal outside of the heat-affected zone, wherein no change in physical properties or micro-structure has taken place.

unbleached (paper) The term is applied to pulp or paper which is in its natural state or unbleached, as kraft or wrapping paper

uncontrolled spin (aer) A spin in which the controls are of little or no use in effecting a recovery

undercarriage (aer) See landing gear

undercut (weld) A groove melted into the base metal adjacent to the toe of the weld and left unfilled

underexposure (phot) The result of too short an exposure for correct results.

underground cable (el) A cable installed below the surface of the ground Due to the extensive use of ducts in the plac

ing of underground cable, this term has frequently been employed to cover cables installed under conditions where they can readily be placed or withdrawn without disturbing the surrounding ground and it is, therefore desirable that underground cable installed under other conditions always be referred to with some qualifying terms such as "buried."

underlay (print) A piece of paper, cardboard or other substance placed on the bottom of a form to bring it up to proper height for printing

under-run (print-paper) In printing, when the number of copies produced is smaller than the order calls for In papermaking, when the quantity produced by the machine is less than the amount ordered, there is said to be an "under-run."

undock (aer) To remove an airship from its dock.

undulation theory (phy) See wave theory.

unfinished worsteds (text) Worsted fabrics that have a nap developed on the surface which is given a very light shearing so that the pattern is obscured. The term is a misnomer as the process is a finish on worsteds.

uniform acceleration (phy) Acceleration in which there are equal changes in the velocity in equal intervals of time. Also called "constant acceleration."

union fabrics (text) Fabrics made of different yarns and fibers, as a cotton [illegible] linen warp or cotton warp, wool filling

units of wavelength (ph) Spectral radiation energy measurements make it necessary to make some statement as to the unit of wavelength used, since four different units are in use, as shown in the table.

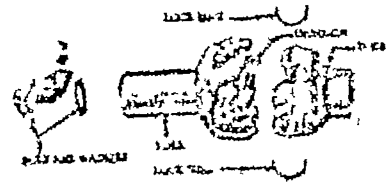
[illegible]

Name	Abbreviation	Value
Micron	μ	[illegible]
Millimicron	mμ	[illegible]
Angstrom	Å	[illegible]
[illegible]	XU	[illegible]

[illegible] It was formerly thought satisfactory to express wavelengths in microns, but if this unit is used, the wavelengths of the entire visible and ultraviolet spectrum are expressed by fractions. To avoid the use of fractions, many authors express wavelengths in millimicrons. Using this unit, the wavelengths of the visible spectrum are expressed by three figures before the decimal point. For most work in radiation measurements, wavelengths expressed by three figures seem to be accurate enough, but some workers express wavelengths in Angstrom units in all cases; hence it seems impossible to get unity of action even among workers in radiation measurements. The spectroscopist uses Angstrom units for all of his work except in the x ray region, where the unit XU (XU=0.001 Å) is often used.

unity (alg) The number 1.

universal joint (aut) This type of joint permits transmission by revolving motion of a shaft plus up and down motion. It is the type of joint connecting a drive shaft to the rear axle of a motor vehicle, permitting the rear axle and wheels to move up and down without interfering with the drive.



UNIVERSAL JOINT PARTS

(Courtesy General Motors Corporation)

universal motor (el) A series-wound or a compensated series-wound motor which may be operated either on direct current or single-phase alternating current at approximately the same speed and output. These conditions must be met when the direct-current and alternating-current voltages are approximately the same and the frequency of the alternating current is not greater than 60 cycles per second.

unlaying (rigging) Untwisting of the strands or cords of a rope.

unshielded carbon arc welding. A carbon arc welding process wherein no shielding medium is used.

unshielded metal arc welding. A metal arc welding process wherein no shielding medium is used.

unshrinkable wool (text) Wool which has been treated with chlorine or chlorine-producing compounds, which reduce the amount of shrinkage in laundering In spite of the treatment the woolen fabric continues to shrink to some extent. See chlorinated wool.

unstable oscillation (aer) An oscillation whose amplitude increases continuously until an attitude is reached from which there is no tendency to return toward the original attitude, the motion becoming a steady divergence

unsymmetrical loading (stress analysis) A design loading condition for the wings and connecting members, representing the conditions as in a roll.

upcut (of a file) The series of teeth superimposed on the overcut and at an angle to it on a double cut file.

updraft (met), Any vertical wind directed upward, but particularly in or near a cumulus cloud and thunderstorm, and along a mountain slope.

upland cotton (text) General classification of all cotton grown in the highlands of the South. Short staple; distinguished from Pima, sea-island, or Egyptian cotton.

upper case (print) The capital case.

upper dead center (aut) See top dead center

upper-surface aileron (aer). A split flap forming the rear upper surface of a wing, deflected for lateral control.

upper works (ship) The superstructure, or deck erections located on or above the weather deck Sometimes used with reference to a ship's entire above-water structure.

upset butt welding A resistance welding process wherein the current is applied after the parts to be welded are brought in contact and wherein the heat is derived from resistance to the flow of current.

uptake (ship) 1 The part connecting smoke box to funnel Sometimes the term is used to include the entire smoke box. 2. The enclosed trunk connecting a boiler or a group of boilers to the smokestack.

uranium (U) A heavy white metal in the pure state. Always found in the combined form. At. wt. 238.17, at. no. 92, m p. 1850° to 3360° C, sp gr 18 7

urea (chem) Employed industrially to stabilize explosives and celluloid compositions, and in calico printing

useful lift (aerostat) The lift available for carrying passengers, fuel, oil, supplies, cargo, etc. It is the difference between the gross lift and the fixed weight of an aerostat.

useful load (aer) The crew and passengers, oil and fuel, ballast other than emergency, ordnance, and portable equipment.

utility bench vise (tool), A vise which has scored, removable jaws and is also equipped with pipe jaws and an anvil-faced back jaw It will hold heavier work than the machinist's vise and will also grip pipe or round rod firmly, the back jaw can be used as an anvil for light work.

V

vacuum (phy) The result of reducing atmospheric pressure.

vacuum gauge (el). A device which indicates the absolute gas pressure in the evacuated parts of the rectifier. The absolute gas pressure is expressed in microns, one micron being the pressure which will support a column of mercury *1/1000 of a millimeter high.* There are two types of vacuum gauges in common use: the McLeod type, which measures only the sum of the partial pressure of the noncondensed (or non-condensing) gases, and the [illegible] type which measures the total pressure of all gases contained in the rectifier tank.

vacuum phototube (rad) A type of phototube which is evacuated to such a degree that the residual gas plays a negligible part in its operation.

vacuum tank (aut) A small tank which receives gasoline from the fuel tank and then supplies it to the [illegible] regardless of the angle at which the [illegible] [illegible].

vacuum tube (el rad) A device consisting of an evacuated [illegible] containing a number of electrodes between two or more of which [illegible] of electricity through the vacuum or contained gas may take place.

vacuum-tube rectifier (el). A rectifier in which [illegible] [illegible] by the [illegible] [illegible] passage of [illegible] from a heated [illegible] within an evacuated [illegible].

Structure of a Metal Radio Tube



[illegible] [illegible] Corporation of [illegible]

vacuum-tube transmitter (rad). A radio [illegible] [illegible] [illegible] tubes are [illegible] to [illegible] the [illegible] [illegible] power [illegible] [illegible] [illegible] point.

vacuum-tube voltmeter (rad) A device [illegible] of the [illegible] of a vacuum tube for measuring [illegible] [illegible].

valence (chem) A term used in chemistry to express the combining power of an atom with another atom.

valley (bldg) The internal angle formed by the two slopes of a roof.

valley rafters (bldg) Rafters extending from an inside angle of the plates toward the ridge or center line of the house.

valve (aer) To release air or supporting gas from an aerostat into the atmosphere. See also automatic valve, maneuvering valve.

valve grinding (aut) This is required more frequently for the exhaust valves than for the inlet valves Both the beveled valve face and seat become pitted and must be ground smooth by using a grinding paste and revolving the valve until the roughness is worn down. A valve-grinding machine is also used for this purpose.

valve-head diameter (aut). The diameter of the opening of the valve, usually from 1/3 to ½ the cylinder diameter

valve hood (aer) The appliance having the form of a hood or parasol, which protects the valve of an airship or balloon against rain, also called "valve cover" or "bonnet."

valve lag (aut) The time a valve remains open after it is supposed to close.

valve lead (aut). The time or distance the valve remains open before the piston reaches top or bottom center

valve lift (aut) The height the valve is raised from its seat by the cam and the valve stem.

valve lifter (aut) See tappet.

valve petticoat (aer) A special sleeve between the valve and gas container making it possible to tie off the sleeve and change valves without loss of gas.

valve rocker (aut) See rocker arm.

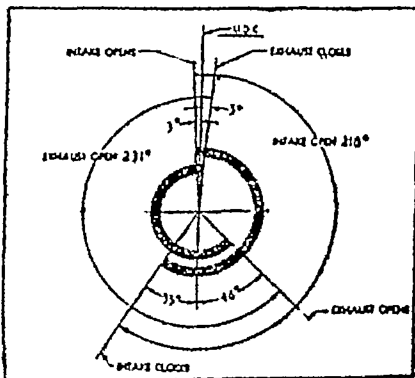
valve seal (aer). A fabric cover used to seal the automatic valves of a rigid airship while it is docked.

valve seat (aut) That part of the combustion chamber upon which the valve face rests

valve seat insert (aut) A ring of special, hard material fastened into the cylinder to form the valve seat.

valve spring (aut) This spring holds the valve tight in its seat.

valve-stem clearance (aut) The space between the end of the valve stem and the valve tappet when the tappet is farthest down and the valve is seated. Also called "air gap" and "valve-tappet clearance."



Valve Timing Diagram

vanadium (V) A white metal that readily combines with oxygen. Used in the manufacture of special steels At. wt. 50 95; at. no 23, m.p 1720° C., sp gr 6 025

vane-type relay (el) A type of alternating-current relay in which a light metal disk or vane moves in response to a change of the current in the controlling circuit.

vane-type supercharger (aer) A positive-displacement rotary blower having an eccentrically located rotor provided with one or more vanes

vanishing point (draw) See one-point drawings.

vapor lock (aer-aut) A condition arising when the gasoline in the fuel lines gets too hot, and bubbles form and interrupt the steady flow of gasoline to the carburetor. This condition in turn results in uneven fuel supply to the engine and may cause missing or misfiring

variable cam (phot) A device on some automatic focusing enlargers which keeps the image in focus while the lamp house is moved up or down to adjust the size of the image.

variable capacitor (el) See continuously adjustable capacitor.

variable inductor (el) See continuously adjustable inductor.

variable resistor (el). See continuously adjustable resistor.

variation (air nav) The angle between the plane of the true meridian and a line passing through a freely suspended compass needle influenced solely by the earth's magnetism. It is named east or west according to the direction of the compass needle from true north. Variation changes with time and place.

vector (math-phy). A line which has both magnitude and direction. Its direction is defined relative to some fixed directed axis when it is in a given plane, and relative to three fixed directed lines when in space. See also vector quantity.

vector analysis (math phy). The study of vectors, relations between vectors, and their applications

vector quantity (math phy) A quantity which has both magnitude and direction. Examples of physical quantities that are vectors: displacement, velocity, force, [illegible]. Also called "vector."

vellum (paper). A kind of paper made from the [illegible] [illegible]. See parchment.

vellum finish (paper). Paper or cardboard made with a surface that looks and feels like vellum, the smooth, natural surface of a finely prepared leather

velocity (phy) The rate of motion or speed of a body at any instant; usually measured in miles per hour or feet per second or minute.

vent (aer) See fuel-tank vent, oil tank vent, parachute vent.

ventilator (ship) A device for furnishing fresh air to compartments below deck, or for exhausting foul air

venturi tube (aer) A short tube of varying cross section. The flow through the venturi causes a pressure drop in the smallest section, the amount of the drop being a function of the velocity of flow. The venturi tube has a narrowing throat or constriction to increase the velocity of the gas or fluid flowing through it. Also called "venturi."

VENTURI TUBE

verge boards (bldg). The boards which serve as the eaves finish on the gable end of a building

vermilion. A beautiful red color tending to scarlet, [illegible]

vernier An auxiliary scale used for reading fractions of the smallest division of a main scale.

vertical [illegible] A [illegible]

vertical center keelson (ship). See **vertical keel.**

vertical feed (mach) Feed in a vertical or up-and-down direction.

vertical keel (ship) A keelson of strong vertical plates fitted at the center line upon the keel and to which the (half) floor plates are connected by welding or by vertical angle bars.

vertical position (of welding) A position of welding in which the axis of the weld is approximately vertical.

vertical tail area (aer) The area of the actual outline of the rudder and the fin projected in the vertical plane, the fairings and fillets being ignored

vestibule (bldg) An entrance to a house, usually inclosed.

vibration (phy) See oscillation.

vibration damper (aut) A device to regulate the torsional (twisting) vibration of a multiple cylinder engine crankshaft.

view camera (phot) A studio type of camera with removable lens board holding the lens and shutter, equipped with a bellows extension, a focusing cloth, ground glass focusing screen, plate holder, and rack and pinion adjustment.

view finder (phot) See finder.

vignette (print) Before the day of halftones, the term vignette was applied to little woodcuts that precede a title page or were used to embellish initials, and as chapter heads and tail-pieces not enclosed within a definite border These cuts contained garlands, festoons, trailing vines, etc., hence the name vignette.

vignetting (phot) The shading off of the space around the figure or object in print or enlargement.

vinculum (alg) A straight line symbol used to group terms which are to be treated as a single expression. It appears over the radical sign in the square root arrangement. Normally, brackets and braces are used for grouping terms

virgin wool (text) Wool that has not been used in the previous manufacture of yarn or fabrics.

viscometer See **viscosimeter**

viscose rayon (text) Rayon made from a regenerated cellulose which has been coagulated from a solution of cellulose xanthate.

viscosimeter A device which measures the viscosity of fuels, oils, paints, and other liquids

viscosity (aut) The viscosity of an oil refers to its internal resistance to flow It is the opposite of fluidity A high viscosity oil is thick and flows with difficulty, a low viscosity oil is thin and flows readily Refiners designate their various grades of oil by a series of SAE (Society of Automotive Engineers) numbers such as SAE 20W, SAE 30, SAE 40, etc. The higher the number, the heavier the oil.

viscosity (chem-phy) The internal friction of a liquid, the resistance to shear or flow The unit of viscosity is the poise

vises (tool) The vises ordinarily used in the machine shop are the machinist's vise, the utility bench vise, and the pipe vise For details consult their respective entries.

visibility (aer) The greatest distance at which conspicuous objects can be seen and identified.

visibility (met) A property of the atmosphere measuring its transparency.

voice-frequency carrier telegraphy That form of carrier telegraphy in which the carrier currents have frequencies such that the modulated currents may be transmitted over a voice frequency telephone channel.

voice frequency telephony. That form of telephony in which the frequencies of the components of the transmitted electric waves are substantially the same as the frequencies of corresponding components of the actuating acoustical waves This type of electric wave is called a "voice-frequency electric wave."

volatility (chem). The ability of a liquid to vaporize or turn into a gas.

volt (el). The unit of potential, potential difference, emf, or electrical pressure. A volt is equal to one hundred million (10^8) abvolts. It is the difference of potential which, when steadily applied to a conductor whose resistance is one ohm, will produce a current of one ampere.

Volta effect (el). See contact potential.

voltage amplification (rad). The ratio of the alternating voltage produced at the output terminals of an amplifier, to the voltage impressed at the input terminals.

voltage divider (rad). A resistor provided with fixed or movable contacts and with two fixed terminal contacts, current is passed between the terminal contacts, and a desired voltage is obtained across a portion of the resistor. The term potentiometer is often erroneously used for this device.

voltage regulator (el). A device used in connection with generators to keep voltage constant as load or speed is changed.

voltmeter (el). An instrument for measuring voltage. Voltmeters are graduated with a scale usually graduated in volts, millivolts or kilovolts.

volumetric efficiency (mt). The ratio of the volume of air or fuel charge [illegible] taken [illegible] of the [illegible] the [illegible] weight of air or fuel charge [illegible] the cylinder.

V-type (mt). 1. Two rows (or banks) of engine cylinders arranged in V [illegible] 2. Any object having a V-shape, such as a V-block.

vertical center keelson (ship). See vertical keel.

vertical feed (mach) Feed in a vertical or up-and-down direction

vertical keel (ship) A keelson of strong vertical plates fitted at the center line upon the keel and to which the (half) floor plates are connected by welding or by vertical angle bars.

vertical position (of welding) A position of welding in which the axis of the weld is approximately vertical.

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vibration (phy) See oscillation.

vibration damper (aut) A device to regulate the torsional (twisting) vibration of a multiple cylinder engine crankshaft.

view camera (phot). A studio type of camera with removable lens board holding the lens and shutter, equipped with a bellows extension, a focusing cloth, ground glass focusing screen, plate holder, and rack and pinion adjustment.

view finder (phot). See finder

vignette (print) Before the day of halftones, the term vignette was applied to little woodcuts that precede a title page or were used to embellish initials, and as chapter heads and tail-pieces not enclosed within a definite border These cuts contained garlands, festoons, trailing vines, etc., hence the name vignette

vignetting (phot) The shading off of the space around the figure or object in print or enlargement.

vinculum (alg) A straight line symbol used to group terms which are to be treated as a single expression It appears over the radical sign in the square root arrangement. Normally, brackets and braces are used for grouping terms.

virgin wool (text) Wool that has not been used in the previous manufacture of yarn or fabrics.

viscometer See viscosimeter.

viscose rayon (text) Rayon made from a regenerated cellulose which has been coagulated from a solution of cellulose xanthate.

viscosimeter A device which measures the viscosity of fuels, oils, paints, and other liquids

viscosity (aut) The viscosity of an oil refers to its internal resistance to flow It is the opposite of fluidity A high viscosity oil is thick and flows with difficulty, a low viscosity oil is thin and flows readily Refiners designate their various grades of oil by a series of SAE (Society of Automotive Engineers) numbers such as SAE 20W, SAE 30, SAE 40, etc. The higher the number, the heavier the oil.

viscosity (chem-phy) The internal friction of a liquid, the resistance to shear or flow The unit of viscosity is the poise.

vises (tool) The vises ordinarily used in the machine shop are the machinist's vise, the utility bench vise, and the pipe vise For details consult their respective entries

visibility (aer) The greatest distance at which conspicuous objects can be seen and identified.

visibility (met) A property of the atmosphere measuring its transparency

voice-frequency carrier telegraphy That form of carrier telegraphy in which the carrier currents have frequencies such that the modulated currents may be transmitted over a voice frequency telephone channel.

voice-frequency telephony That form of telephony in which the frequencies of the components of the transmitted electric waves are substantially the same as the frequencies of corresponding components of the actuating acoustical waves. This type of electric wave is called a "voice-frequency electric wave"

volatility (chem) The ability of a liquid to vaporize or turn into a gas

volt (el) The unit of potential, potential difference, emf, or electrical pressure. A volt is equal to one hundred million (10^8) abvolts It is the difference of potential which, when steadily applied to a conductor whose resistance is one ohm, will produce a current of one ampere

Volta effect (el) See contact potential.

voltage amplification (rad) The ratio of the alternating voltage produced at the output terminals of an amplifier to the voltage impressed at the input terminals.

voltage divider (rad) A resistor provided with fixed or movable contacts and with two fixed terminal contacts current is passed between the terminal contacts, and a desired voltage is obtained across a portion of the resistor. The term potentiometer is often erroneously used for this device.

voltage regulator (el) A device used in connection with generators to keep the voltage constant as load or speed is changed.

voltmeter (el) An instrument for measuring voltage. Voltmeters are provided with a scale usually graduated in volts, millivolts or kilovolts.

volumetric efficiency (aut) The ratio of the volume of air or fuel charge actually taken into the cylinder to the volume of the piston displacement. The greater the volumetric efficiency the greater the weight of air or fuel charge taken into the cylinder

V-type (aut) 1 Two rows (or banks) of engine cylinders arranged in V form. 2. Any object having a V-shape, such as a V block.

W

wainscoting (carp) Matched boarding or panel work covering the lower portion of a wall.

wale (knitted fabrics). A series of loops in successive courses, lying lengthwise of the fabric, and formed by the action of one needle.

walkway (ship) See cat walk.

walkway girder (aer) A girder supporting a walkway along the keel or other part of a rigid or semirigid airship

warm front (met) A narrow zone along which warm air is forcibly displacing colder air

warm sector (met). That part of a cyclonic wind system occupied by warm air.

warp (aer). To change the form of a wing by twisting it. Warping was formerly used to perform the function now performed by ailerons.

warp (text) 1 The yarn running lengthwise in a woven fabric, 2. The sheet of yarns laid together on a beam to form a warp. 3. Those threads on the loom from back to front through which the weft threads pass.

warp beam (text). A beam on which the reserve warp is wound. It is located at the back of the loom.

warp-knit fabric (text) A fabric knitted on a special knitting machine which produces a flatter, closer, and less elastic material than produced by other machines.

wash (aer) The disturbance in the air produced by the passage of an airfoil Also called the "wake" in the general case for any solid body

wash (bldg) The slant upon a sill, capping, etc., to allow the water to run off easily

wash drawing (art) A drawing made in sepia, India ink, or transparent colors, in which the colors are washed lightly and evenly over the surface, as with a brush, used for architectural drawings, machinery, industrial designs, etc.

washer (mach). A perforated metal disk often put under nut or bolt heads to protect the pieces being fastened or to make tightening up easier Lock washers are made of spring steel and exert a light bite on a nut to keep it from turning and becoming loose.

washin (aer). A warp of an airplane wing giving an increase of the angle of attack toward the tip

washing (phot) The purpose of washing is to remove all traces of the fixing bath from the emulsion so that nothing will be left in it but the silver which forms the image.

wash-off relief process (phot). A special process of color photography consisting of the washing off of soft gelatin from a film (the matrix) to leave a relief image of hardened gelatin.

washout (aer). A warp of an airplane wing giving a decrease of the angle of attack toward the tip.

water ballast (ship). Sea water used for ballast, let into the double bottom, or into a water-ballast tank, or into trimming tanks.

water ballast tanks (ship) Tanks in the double bottom, used for ballast.

water gas. A gas made by forcing steam over incandescent carbon (coke) whereby there results a mixture of hydrogen and carbon monoxide. It is sometimes used as a fuel, but usually is carbureted with illuminating constituents prepared from oil and used as illuminating gas. Steam passed through a mixture of hydrocarbons.

water lines (ship) Lines drawn parallel with the surface of the water at varying heights on a ship's outline In the sheer plan, they are straight and horizontal. In the half breadth plan, they show the form of the ship at each of the successive heights marked See also "light water line," and "loaded water line."

watermark (paper) The faintly marked figure, letter, or design in the fabric, usually not noticeable except when the sheet is held up to the light. The watermark in a sheet of paper is formed while in a state of pulp, when a raised design or pattern made of thin wire worked into the required shape is fastened upon the surface of the wire which forms the mold The layer of fibers over every portion of the design is thinner than the surrounding layer which forms on the surface of the mold in the ordinary way and the design appears as a translucent design in the dry paper

water of crystallization (chem) Water resulting from the heating of crystals.

waterproof paper There are many varieties of waterproof paper, among them [illegible] and [illegible] papers, [illegible] parchments and [illegible] papers etc. This type of paper is prepared by [illegible] in a solution of [illegible]

water [illegible] [illegible]

combustion engines, in order to avoid the valving of gas as the fuel is consumed.

waterspout (met) A tornado at sea It is an intense counter-clockwise vortex capable of drawing water off the sea surface

water table (bldg) The finish at the bottom of a house which carries the water away from the foundation.

watertight. Provided with an enclosing case which will exclude water applied in the form of a hose stream for a specified time. A common form of specification for "watertight" is "so constructed that a stream of water from a hose (1 inch in diameter) under a head of about 35 feet and from a distance of ten feet can be played on the apparatus for five minutes without penetration of water into the interior".

watertight bulkhead (ship) A bulkhead that will not let water pass from one side of it to the other.

watertight compartment (ship). A compartment having a watertight bulkhead at each end.

watertight gland. See stuffing box.

water tunnel (aer) A device similar to a a wind tunnel, but using water as the working fluid.

water vapor (met). Water in gaseous form.

water vapor pressure (text) The component of atmospheric pressure caused by the presence of water vapor Expressed in inches or millimeters of mercury.

waterway (ship). A gutter at the edge of a deck for draining water to the scuppers See also gutter.

waterway bar (ship). An angle or flat bar attached to a deck [illegible] [illegible] waterway and [illegible]

watt [illegible] [illegible]

current of one ampere flowing under a potential drop of one volt, 1/736 of one horsepower, ten million (10^7) ergs per second, one joule per second.

watthour (el) A unit of measure of electrical energy, the work done by one watt acting for one hour It equals 36 10^9 ergs, or 3,600 joules.

watthour meter (el) An electricity meter that measures and registers electric energy in watthours or kilowatthours.

wattmeter (el). An instrument for measuring electrical power Wattmeters are provided with a scale, usually graduated in watts or kilowatts

wave (in an electric circuit) The variation of current and/or potential at any point in the electric circuit.

wave (phy) A disturbance which is propagated in a medium in such a manner that at any point in the medium the displacement is a function of the time, while at any instant the displacement at a point is a function of the position of the point. Any physical quantity which has the same relationship to some independent variable (usually time) that a propagated disturbance has, at a particular instant, with respect to space, may be called a wave

wave (rad) (a) A propagated disturbance, usually periodic, (b) a single cycle of such a disturbance, or c) a periodic variation as represented by a graph.

wave antenna (rad) A horizontal conductor having a length of an order of magnitude which is the same as or greater than that of the radio wave received, which operates to receive energy by virtue of the tilt of the radio waves while passing along the ground, and is so used as to be strongly directional.

wavelength (rad) The distance traveled in one period or cycle by a periodic disturbance. See also units of wavelength.

wave motion (met) Orderly oscillations in a fluid medium, as illustrated by ocean waves and frontal waves.

wave theory (phy) Sunlight is propagated as wave motion in a medium called the ether The distance between two successive crests or valleys of a wave is known as the wavelength. Short waves produce on the retina of the eye the sensation of blue, intermediate waves the sensation of yellow, and long waves the sensation of red. The simultaneous perception of the entire range of waves that affect the eye produces white.

wax engraving (print) A common method for making printing plates for maps, charts, diagrams, and other classes of work. A polished plate of copper, brass, zinc, or other metal is covered with a thin film of specially prepared wax, and upon this the design may be made either by photography, hand drawing, or transfer method.

wax pattern (weld) Wax molded around the parts to be welded by the thermit welding process to the form desired for the completed weld.

way (ship). The framework or timber, etc., on which a vessel is built and from which she is launched into the water

weak (phot). Thin, lifeless, lacking contrast, as applied to a negative.

wear (nav) Tiller up (helm aweather) so that the boat's head falls off from the wind, sails gybe, and the boat comes by the wind on the other tack. Opposite of "tack", in wearing, the boat's stern passes through the direction from which the wind comes, while in tacking, the bow passes through the wind.

weather (nav) In sailing to pass to windward of another boat or object. It also means successfully to ride out a squall or storm.

weather deck (ship) A deck exposed to the wind and sea, i.e., not fully covered by a deck above and with side plate coming up to it. Cf. shelter deck.

weather side (nav) The side toward the wind; opposite of lee side.

weaving (weld) A technique of depositing weld metal in which the electrode is oscillated.

web (ship). The plate or its equivalent in a beam or girder, which connects the upper and lower flat plates of laterally extending members.

webbing (text). A strong, closely woven, narrow, cotton material for belts and straps. Also made in silk, linen, or mixtures.

web frame (ship) A frame built up transversely with a plate or plates to give greater stiffness

web press (print) A printing machine which is automatically supplied with paper from a great roll or web, usually a rotary machine, but there are flat-bed presses in which the same method of supplying paper is used All modern large newspaper presses are web presses

wedges (ship) Tapered pieces of wood or iron, used extensively to force parts into place.

weeping (ship). The oozing of water through the seams of a vessel's shell, or through the plates of a steam boiler

weft (text) Those threads which pass through the warp They are wound on the shuttle or bobbin.

weight of type (print). Four square inches of types, composed solid, weigh approximately one pound Thus, to find the weight of any given amount of type composition, find the number of square inches and divide by four

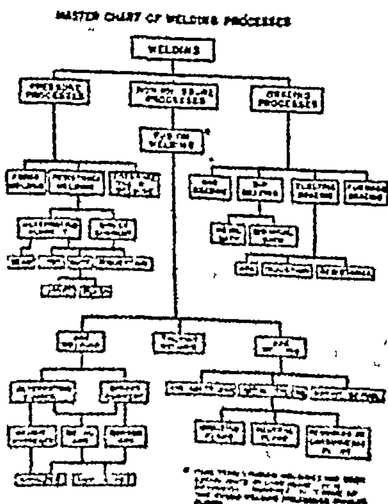
weld. A localized consolidation of metals by a welding process.

welded joint. A localized union of two or more parts by welding.

welding. Connecting two separate pieces of steel, iron, or other metal with a gas flame or an electric arc, so that they fuse into one piece

welding ground (in arc welding) The side of the circuit opposite the welding electrode

welding leads. Conductors furnishing an electrical path between the source of welding power and the [illegible]



(Courtesy, American Welding Society)

welding operator (weld) An operator of welding equipment. The term "welder" is properly applied only to a welding machine.

welding pressure External force applied in the pressure welding processes to control the current density throughout the weld or effects of heat or both.

welding procedure. The detailed methods and practices involved in the production of a welded structure.

welding rod. Filler metal, in wire or rod form, used in the gas welding process and those arc welding processes wherein the electrode does not furnish the deposited metal.

welding sequence. The order of welding the component parts of a assembly.

welding tip. A gas torch tip especially adapted for welding

welding torch (blowpipe). A device used in gas welding for mixing and controlling the gases.

weldment (weld) An assembly whose component parts are joined by welding

weld metal. The metal resulting from the fusion of the filler or base metals or both

weld period. The time required to go through one complete cycle of a welding operation

weld time. The interval during which current is allowed to flow through the work during the performance of one weld In pulsation welding, the weld period includes the "cool" time intervals.

well (ship) That portion of any upper deck or weather deck between a bridge and a *forecastle bulkhead*

well deck vessel (ship) A vessel having a long poop, or raised quarter-deck, and the bridge house combined, and a forecastle, the deepening between these structures forming the "well"

western hemlock (lumber). See giant hemlock

western yellow pine (*pinus ponderosa*) A fairly hard but light and durable wood, ranging in color from pale to reddish yellow Supplies construction lumber and trim Weight 28 lbs. per cu. ft. (air-dried) Maximum crushing strength 5,990 lbs. per sq in Shearing strength parallel to grain 1,160 lbs. per sq in.

wet bulb temperature (met) The temperature shown by a thermometer whose bulb is moist and properly ventilated. The difference between dry- and wet-bulb temperatures is a measure of the water vapor present in the atmosphere.

wet cell (el) A cell whose electrolyte is in liquid form and free to flow and move

wet collodion process (phot) An early photographic process invented by an Englishman named Scott Archer in 1851. In this process a glass plate was coated with collodion (made by dissolving nitrated cotton in ether and alcohol) and then immersed in a bath of nitrate of silver which formed silver iodide in the wet collodion film. After exposure, the image was developed, fixed and dried and the negative printed on albumenized paper

wet rot (lumber) A form of decay which occurs in growing trees and is similar to dry rot. It occurs when the wood becomes saturated with water which it absorbs from a swamp or bog. It may be readily communicated from one piece of wood to another by contact.

Wheatstone automatic telegraphy That form of Morse telegraphy in which telegraph signals are transmitted mechanically from a perforated tape and recorded automatically in dots and dashes on a tape.

wheel base (aut) The distance between the rear and front axles, usually measured in inches

wheel control (aer) See control column.

wheel house (ship) A house over the steering wheel.

whipcord (text). A firm, smooth material of wool, cotton, or a mixture, with a conspicuous diagonal cord across the face

whipping (rigging) Wrapping an end tightly with cord or twine to prevent its unlaying when pulled through a pulley or other small opening

whip stitching (book) When the leaves of a book have no fold at the back, they are sewed together in sections, the stitches on the back of each section being close together and extended from top to bottom This is called whipstitching The sections are then sewed together like the sections of a book having folded leaves.

white ash (*fraxinus americana*). Ranks next to oak as a commercially valuable wood. Used for tool handles, wagons, furniture, cars, etc. Wt. 44 lbs per cu ft. (air-dried) Maximum crushing strength 9,120 lbs. per sq in Shearing strength parallel to grain 2,520 lbs. per sq. in

white cedar (*thuja occidentalis*). Provides a very durable wood. Used for fencing, poles, shingles, and barrel staves. Wt. 22 lbs. per cu. ft. (air-dried) Maximum

crushing strength 4,140 lbs. per sq. in. Shearing strength parallel to grain 900 lbs. per sq. in.

white elm (*ulmus americana*) A durable wood used for ship building, wheel hubs, barrel staves. Wt. 35 lbs. per cu. ft. (air-dried) Maximum crushing strength 0,850 lbs per sq in. Shearing strength parallel to grain 1,740 lbs. per sq in.

white lead (paint) A pigment extensively used in the paint industry It is a white amorphous powder Used for paint pigment, putty, and ceramic glazes, and also as a substitute for red lead in protective paints.

white oak (*quercus alba*). A stout, heavy, close-grained wood, very valuable commercially Used for beams flooring, furniture, interior and exterior building, etc. Wt. 48 lbs. per cu. ft. (air-dried) Maximum crushing strength 7,010 lbs. per sq in. Shearing strength parallel to grain 2,090 lbs. per sq in

white pine (*pinus strobus*) The wood of this tree is fairly soft and excellent for finishing work. It can be recognized by its off-color yellow hue. Wt. 27 lbs. per cubic foot, green. Maximum crushing strength 6,[illegible]0 lbs. per sq in. Shearing strength parallel to grain 1,070 lbs per sq in

white spruce (*picea canadensis*) White, straight grained wood. A source of paper pulp Also used in building. Wt. [illegible] lbs. per cu ft. (air-dried) Maximum crushing strength 6,020 lbs. per sq in Shearing strength parallel to grain 970 lbs. per sq in.

whiting (chem) A form of calcium carbonate which is ground, levigated, and dried It is a white amorphous powder. The physical properties vary according to [illegible] the process of manufacture, and the care used in the preparation of the material. It is used as a substitute for [illegible] in ceramic glazes, and in the manufacture of rubber Also called "Paris white" and "gilders whiting."

[illegible]

by a horizontally swinging disk with or without a red light attached.

Wimshurst machine (el) See electrostatic generator.

winch (ship) A machine used for loading and discharging cargo, or for hauling in lines

winch head (ship) A drum, usually of small diameter and concave in shape, on a winch. It is designed for taking and holding the turns of a rope

winch suspension (aer) The rigging by means of which the lift and drag of a kite balloon are transmitted from the envelope to the towing or traction cable

wind ("i" as in kind) (carp) A term used to describe the surface of a board when twisted (winding) or when resting upon two diagonally opposite corners, if laid upon a perfectly flat surface.

wind angle (from course) (air nav) The angular difference between the course (true) of an aircraft and the wind direction, measured to the right or left of the aircraft's course to the direction from which the wind blows The wind angle never exceeds 180 degrees

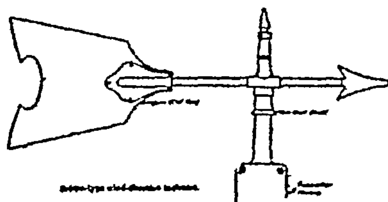
wind angle (from heading) (air nav). The angular difference between the true heading of an aircraft and the wind direction, measured clockwise from the heading to the direction from which the wind blows This wind angle may be any number of degrees from [illegible] to [illegible]. This definition applies when making double drift turns from heading

wind cone (aer) A tapered fabric sleeve pivoted on a standard to indicate the wind direction.

wind direction and force (air nav) The wind is designated by the direction from which it blows The force of the wind is expressed as the speed in miles per hour or knots

wind-driven generator [illegible] A generator used [illegible] which derives its power from the air [illegible] [illegible]

wind indicator (aer) A device that indicates the direction and velocity of the surface wind.



(Courtesy Friez Instrument Division, Bendix Aviation Corporation)

windlass (ship) A special form of winch used to hoist the anchors. It has two drums designed to grab the links of the anchor chains and is fitted with a ratchet and braking device suitable for "paying out" the chain.

window glass. A transparent, relatively thin, flat glass having glossy, fire-finished apparently plane and smooth surfaces, but having a characteristic waviness of surface which is visible when viewed at an acute angle or in reflected light.

wind rose (met). A diagram which shows for a given locality or area the frequency and strength of the wind from various directions.

windshake (lumber) The separation of the annual rings This defect is most common in pine timber Windshake sometimes extends several feet up the trunk of a tree.

wind star (air nav) A solution for the force and direction of the wind by the double drift method.

wind system (met). Any pattern of winds that persists for a reasonable period of time A cyclone is a wind system, whereas a gust is not.

wind tee (aer). A large T-shaped weather vane located on a landing field or on the top of an adjacent structure to indicate the direction of the wind. It may have the form of an airplane and may be illuminated for night landings. Also called "landing tee."

wind tunnel (aer) An apparatus producing an artificial wind or air stream, in which objects are placed for investigating the air flow about them and the aerodynamic forces exerted on them.

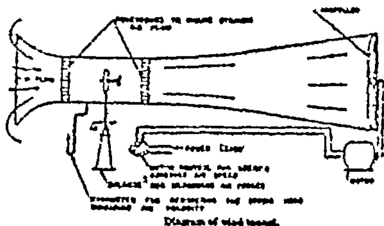


Diagram of wind tunnel.

wing (aer) A general term applied to the airfoil, or one of the airfoils, designed to develop a major part of the lift of a heavier-than-air craft.

wing and wing (nav) With sails out on both sides. This is done in sailing right before the wind, and an oar or spar may even be used to extend the foot of a boomless sail if the breeze is not too strong

wing area (aer) Wing area is measured from the projection of the actual outline on the plane of the chords, without deduction for area blanketed by fuselage or nacelles That part of the area, so determined, which lies within the fuselage or nacelles is bounded by two lateral lines that connect the intersections of the leading and trailing edges with the fuselage or nacelle, ignoring fairings and fillets. For the purpose of calculating area, a wing is considered to extend without interruption through the fuselage and nacelles Unless otherwise stated, wing area always refers to total area including ailerons.

wing axis (aer) The locus of the aerodynamic centers of all the wing sections.

wing dividers (carp) A tool composed of two hinged, pointed legs, an angle indicator, and a setscrew Used to describe circles, measure angles, distances and thicknesses.

wingheavy (right or left) (aer) The condition of an airplane whose right or left

wing tends to sink when the lateral control is released in any given attitude of normal flight.

wing loading (aer). The gross weight of an airplane divided by the wing area.

wing-over (aer). A maneuver in which the airplane is put into a climbing turn until nearly stalled, at which point the nose is allowed to fall while continuing the turn, then returned to normal flight from the ensuing dive or glide in a direction approximately 180° from that at the start of the evolution.

wing profile (aer). The outline of a wing section.

wing rib (aer). A chord-wise member of the wing structure of an airplane, used to give the wing section its form and to transmit the load from the fabric to the spars.

wing section (aer) A cross section of a wing parallel to the plane of symmetry or to a specified reference plane.

wing skid (aer) A skid placed near the wing tip to protect the wing from contact with the ground.

wing spar (aer) A principal span-wise member of the wing structure of an airplane.

wing tip (aer). The outer end of an airplane wing.

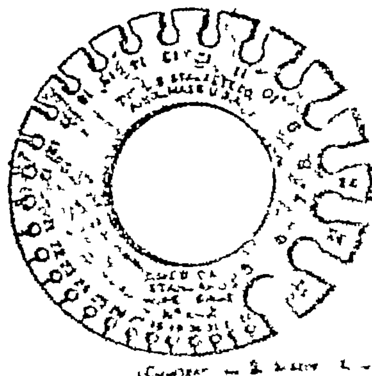
wing-tip flare (aer). A pyrotechnic device attached to an aircraft for illuminating the ground while landing

wing tip rake (aer) A term referring to the shape of the tip of the wing when the tip edge is sensibly straight in plan but not parallel to the plane of symmetry The amount of rake is measured by the acute angle between the straight portion of the wing tip and the plane of symmetry The rake is positive when the trailing edge is longer than the leading edge.

wiping gland (el) A projecting sleeve on a junction box or other piece of apparatus serving to make a connection to the lead sheath of a cable by means of a plumber's wiped joint.

wire (el). A slender rod or filament of drawn metal The definition restricts the term to what would be ordinarily understood by the term solid wire. In the definition, the word slender is used in the sense that the length is greater in comparison with the diameter If a wire is covered with insulation, it is properly called an insulated wire, while primarily the term wire refers to the metal, nevertheless when the context shows that the wire is insulated, the term wire will be understood to include the insulation

wire and sheet metal gage (sheet metal) This gage is used for measuring the diameter of wire and the thickness of sheet metal Wire diameters and sheet metal thicknesses are, with few exceptions, denoted by numbers. The decimal equivalents of these numbers are [illegible] all the same because of the fact that numerous standards are in general use The most common of these standards are Brown & Sharpe (B&S), National Wire (NW), United States Standard (USS), and Birmingham Wire (BW)



(Courtesy [illegible])

wire mark (paper) [illegible] paper by [illegible] watermark

wire [illegible] (paper) [illegible]

wire side (paper) The side of a sheet of paper which rested on the wire during its manufacture, opposite to "felt side."

wire-stitcher (book) A machine for fastening the leaves of a pamphlet by means of small wire staples.

wolframite (min) A tungstate of iron and manganese. The principal ore of tungsten.

wood chisel (carp) A tool used for operations which necessitate the removal of chips or sections of wood. It consists of a steel blade with a single-bevel cutting edge, a wooden handle is fitted into the tang of the blade Sizes are measured by the width of the cutting edge

woodcut. An engraving on wood or a print from such an engraving

wooden brick (bldg) A piece of seasoned wood, made the size of a brick, and laid where it is necessary to provide a nailing space in masonry walls.

wood engraving 1. The art of cutting designs in relief upon a polished block of wood 2. A print made from a block of this kind.

wood gum (chem) The crude extract of wood and straw with caustic soda, of which xylan is the chief component.

wood pulp (paper) There are two distinct classes, mechanical and chemical. The mechanical or round wood pulp is made by taking logs which have been sawed into convenient lengths removing the bark, and feeding them into a machine where they are ground to atoms by contact with a rapidly revolving grindstone over which water is flowing The pulp is then screened in order to eliminate splinters or chips and is formed into sheets on a wet press machine. Chemical pulp is made by chipping the logs and cooking the chips in large digesters with strong liquors at a high temperature

woof (text) See weft.

woolens (text) A general term for soft wool materials Spun on woolen system.

woolen yarn (tex fibers which h combed or gill

wool felt (text) fibers matted obscuring the High grade fe felts are not wo for billiard tab plasters, slippe

work (phy) The is done by a fo the scalar prod linear distance of application sense, work is over a given di the product of tance. It is ex It should be no time does not c concerning worl pounds is raise pounds of work Whether it requ several weeks t no difference W has been raised the work has b the time requir

worm (aut) A sh threads of whicl a worm gear

worm gear (aut) helical teeth thr of a worm. Al

worsteds (text) smooth, wool m wool yarns

worsted yarn (te fibers which ha gilled or comb

wove paper which the w the threads does not sho laid paper

wrecking bar (section, with claws, the oth

point. It varies in length from 12 to 60 inches. Its uses are much the same as the crowbar and pinch bar, and in addition it may be used for pulling large nails.

wrenches (tool) Tools for tightening or removing nuts, bolt heads, or cap screws; or for gripping round material such as pipe, studs, and round rods. They are generally classified as adjustable wrenches, socket wrenches, open-end wrenches, box wrenches, and pipe wrenches. For details concerning these types of wrenches see their respective entries.

wrist pin (aut) A pin inserted into the small or upper end of the connecting rod, joining the rod to the piston.

wrong draw (text) A defect in a fabric due to the fact that the warp and filling do not interlace in accordance with the prescribed weave or design and caused when one or more warp yarns have been drawn through the wrong harness.

Wye level (surv) See Y-level

wire side (paper) The side of a sheet of paper which rested on the wire during its manufacture, opposite to "felt side."

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wolframite (min) A tungstate of iron and manganese. The principal ore of tungsten

wood chisel (carp) A tool used for operations which necessitate the removal of chips or sections of wood. It consists of a steel blade with a single-bevel cutting edge, a wooden handle is fitted into the tang of the blade Sizes are measured by the width of the cutting edge.

woodcut. An engraving on wood or a print from such an engraving

wooden brick (bldg) A piece of seasoned wood, made the size of a brick, and laid where it is necessary to provide a nailing space in masonry walls

wood engraving 1 The art of cutting designs in relief upon a polished block of wood 2. A print made from a block of this kind.

wood gum (chem) The crude extract of wood and straw with caustic soda, of which xylan is the chief component.

wood pulp (paper) There are two distinct classes; mechanical and chemical The mechanical or round wood pulp is made by taking logs which have been sawed into convenient lengths removing the bark, and feeding them into a machine where they are ground to atoms by contact with a rapidly revolving grindstone over which water is flowing The pulp is then screened in order to eliminate splinters or chips and is formed into sheets on a wet press machine. Chemical pulp is made by chipping the logs and cooking the chips in large digesters with strong liquors at a high temperature

woof (text) See weft.

woolens (text) A general term for soft wool materials. Spun or woolen system.

woolen yarn (text) Yarn spun from wool fibers which have been carded but not combed or gilled.

wool felt (text) A wool material with the fibers matted and pressed together, obscuring the method of construction. High grade felts are woven, common felts are not woven. Many weights. Used for billiard tables, pennants, hats, corn plasters, slippers, and rug linings

work (phy) The mechanical work which is done by a force acting on a body is the scalar product of the force by the linear distance through which the point of application moves. In a physical sense, work is the exertion of a force over a given distance and is defined as the product of the force times the distance It is expressed in foot-pounds. It should be noted that the element of time does not enter into consideration concerning work If a weight of 50 pounds is raised 20 feet, 1000 foot-pounds of work have been accomplished. Whether it required a few minutes or several weeks to raise the weight makes no difference When all of the 50 pounds has been raised to the height of 20 feet, the work has been done irrespective of the time required

worm (aut) A short revolving screw, the threads of which mesh with the teeth of a worm gear

worm gear (aut) A gear having concave, helical teeth that mesh with the threads of a worm. Also called a "worm wheel

worsteds (text) A general term for firm, smooth, wool materials, made of combed wool yarns.

worsted yarn (text) Yarn spun from wool fibers which have been carded and either gilled or combed, or both.

wove paper Paper made on a mold in which the wires are woven together like the threads of ordinary cloth, and which does not show distinct wire-marks, as on laid paper

wrecking bar (carp) A tool, octagonal in section, with one end goose-necked with claws, the other offset with a pinch

point. It varies in length from 12 to 60 inches. Its uses are much the same as the crowbar and pinch bar, and in addition it may be used for pulling large nails.

wrenches (tool) Tools for tightening or removing nuts, bolt heads, or cap screws; or for gripping round material such as pipe, studs, and round rods. They are generally classified as adjustable wrenches, socket wrenches, open-end wrenches, box wrenches, and pipe wrenches. For details concerning these types of wrenches see their respective entries.

wrist pin (aut) A pin inserted into the small or upper end of the connecting rod, joining the rod to the piston.

wrong draw (text) A defect in a fabric due to the fact that the warp and filling do not interlace in accordance with the prescribed weave or design and caused when one or more warp yarns have been drawn through the wrong harness.

Wye level (surv) See Y level

X

x-axis (alg-nav-top) The horizontal center line or axis of a graph or map grid. The line on which the origin of an ordinate is marked. See also **axes of an aircraft.**

x-ray crystallography (metal) The study of the arrangement of the atoms in a crystal by the use of Roentgen rays.

x ray photography. The process of making photographs with x-rays. Such photographs are extensively used by the medical and dental profession in diagnostic and research work. A halftone made by this method is called a "radiograph halftone," and this differs from an ordinary photographic halftone in that it shows only a shadow of the image or subject. X-ray photography is also employed in material testing and analysis.

x rays (radiography) A form of radiant energy derived from the bombardment of a material by electrons in a vacuum at a high voltage, the wave length of the rays being between 10^{-11} and 10^{-8} cm.

x-ray tube (el) A vacuum tube designed for producing x-rays by accelerating electrons to a high velocity by means of an electrostatic field and then suddenly stopping them by collision with a target.

xylem (bot). The woody portion of plants between the pith and cambium.

Y

Yankee screwdriver See spiral ratchet screwdriver

yard (nav) A spar to which the head of a square or lug sail is attached. The term Lug is applied to the forward part of it when it has to be dipped (in some rigs) from one side to the other of the mast in going about.

yarn (text) A general term for an assemblage of fibers or filaments, either natural or manufactured, twisted or laid together to form a continuous strand suitable for use in weaving, knitting, or otherwise intertwining into textile materials.

yarn construction (text). A term used to indicate the size of a single-yarn and the number of strands combined to form each successive unit of a ply yarn or cord.

yarn count (text) A number given to yarn indicating fineness, based upon the number of yards per pound. Also called "yarn number."

yarn dyeing (text) The dyeing of a textile material in the form of a yarn.

yaw (aer) An angular displacement about an axis parallel to the normal axis of an aircraft.

yaw (nav) To veer suddenly and unintentionally off the course.

yawing (aer). Angular motion about the [illegible] axis.

yaw line (aer). A line dropped from the bow of an airship, when mooring to the mast, to be coupled to the mast yaw line and act as a steadying line to prevent yawing and overriding the mast.

yawmeter (aer) An instrument that measures the angle of yaw of an aircraft.

Y-axis (alg-nav-top) The vertical center line or axis of a graph or map grid. The line on which the origin of an abscissa is marked. See also axes of an aircraft.

yellow pine (lumber) See shortleaf pine.

yellow poplar (*liriodendron tulipifera*) A soft, light wood, very valuable commercially Wt. 227 lbs. per cu ft. (air-dried) Maximum crushing strength 7,480 lbs. per sq in. Shearing strength parallel to grain 1,170 lbs. per sq in.

yield point (StM). Stress at which marked increase in deformation of specimen occurs without increase in load as determined usually by drop of beam or with dividers for tensile, compressive or transverse tests. Note many ductile materials do not have a definite yield point. For these it is customary to define a yield strength yield strength—the stress at which a material exhibits a specified limiting permanent set.

yield strength (StM) See yield point.

Y-joint (el) See branch joint.

Y-level (surv). So called because the telescope rests in Y-shaped supports The instrument consists essentially of a telescopic line of sight and an attached spirit level whose axis may, by adjustment, be made parallel to the line of sight, so that when the bubble is in the

zonal aberration (phot). See coma.

zoom (aer) To climb for a short time at an angle greater than the normal climbing angle, the airplane being carried upward at the expense of kinetic energy

zwitterion (chem) An ion that is charged both positively and negatively Also called amphoteric ion and dipole ion.

GEOMETRICAL SHOP DATA

(Courtesy, The L. S. Starrett Company)

To Find Circumference—

Multiply diameter by 3.1416 — Or divide diameter by 0.3183

To Find Diameter—

Multiply circumference by 0.3183 — Or divide circumference by 3.1416

To Find Radius—

Multiply circumference by 0.15915 — Or divide circumference by 6.28318

To Find Side of an Inscribed Square—

Multiply diameter by 0.7071

Or multiply circumference by 0.2251 — Or divide circumference by 4.4428

To Find Side of an Equal Square—

Multiply diameter by 0.8862 — Or divide diameter by 1.1284

Or multiply circumference by 0.2821 — Or divide circumference by 3.545

Square—

A side multiplied by	1.4142	equals diameter of its circumscribing circle.
A side multiplied by	4.443	equals circumference of its circumscribing circle.
A side multiplied by	1.128	equals diameter of an equal circle.
A side multiplied by	3.547	equals circumference of an equal circle.
Square inches multiplied by	1.273	equal circle inches of an equal circle.

To Find the Area of a Circle—

Multiply circumference by one-quarter of the diameter

Or multiply the square of diameter by 0.7854

Or multiply the square of circumference by 0.07958

Or multiply the square of ½ diameter by 3.1416

To Find the Surface of a Sphere or Globe—

Multiply the diameter by the circumference

Or multiply the square of diameter by 3.1416

Or multiply four times the square of radius by 3.1416

AMERICAN STANDARD ABBREVIATIONS FOR SCIENTIFIC AND ENGINEERING TERMS*

INTRODUCTORY NOTES

Scope and Purpose

1. The Executive Committee of the Sectional Committee on Scientific and Engineering Symbols and Abbreviations has made the following distinction between symbols and abbreviations: Letter symbols are letters used to represent magnitudes of physical quantities in equations and mathematical formulas. Abbreviations are shortened forms of names or expressions employed in texts and tabulations, and should not be used in equations.

Fundamental Rules

2. Abbreviations should be used sparingly in text and with due regard to the context and to the training of the reader. Terms denoting units of measurement should be abbreviated in the text only when preceded by the amounts indicated in numerals, thus "several inches," "one inch," "12 in." In tabular matter, specifications, maps, drawings, and texts for special purposes, the use of abbreviations should be governed only by the desirability of conserving space.

3. Short words such as ton, day, and mile should be spelled out.

4. Abbreviations should not be used where the meaning will not be clear. In case of doubt, spell out.

5. The same abbreviation is used for both singular and plural, as "bbl" for barrel and barrels.

6. The use of conventional signs for abbreviations in text is not recommended, thus "per," not /, "lb," not #; "in.," not ″. Such signs may be used sparingly in tables and similar places for conserving space.

7. The period should be omitted except in cases where the omission would result in confusion.

8. The letters of such abbreviations as ASA should not be spaced (not A S A).

9. The use in text of exponents for the abbreviations of square and cube and of the negative exponents for terms involving "per" is not recommended. The superior figures are usually not available on the keyboards of typesetting and linotype machines and composition is therefore delayed. There is also the likelihood of confusion with footnote reference numbers. These shorter forms are permissible in tables and are sometimes difficult to avoid in text.

10. A sentence should not begin with a numeral followed by an abbreviation. Abbreviations for names of units are to be used only after numerical values, such as 25 ft or 110 v.

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*Reprinted by courtesy of The American Society of Mechanical Engineers. This standard was developed under the procedure of the American Standards Association, and published by The American Society of Mechanical Engineers.

Abbreviations*

absolute	abs
acre	spell out
acre-foot	acre-ft
air horsepower	air hp
alternating-current (as adjective)	a-c
ampere	amp
ampere-hour	amp-hr
amplitude, an elliptic function	am.
Angstrom unit	A
antilogarithm	antilog
atmosphere	atm
atomic weight	at. wt
average	avg
avoirdupois	avdp
azimuth	az or α
barometer	bar.
barrel	bbl
Baumé	Bé
board feet (feet board measure)	fbm
boiler pressure	spell out
boiling point	bp
brake horsepower	bhp
brake horsepower-hour	bhp-hr
Brinell hardness number	Bhn
British thermal unit	Btu or B
bushel	bu
calorie	cal
candle	c
candle-hour	c-hr
candlepower	cp
cent	c or ¢
center to center	c to c
centigram	cg
centiliter	cl
centimeter	cm
centimeter-gram-second (system)	cgs
chemical	chem
chemically pure	cp
circular	cir
circular mils	cir mils
coefficient	coef
cologarithm	colog
concentrate	conc
conductivity	cond
constant	const
continental horsepower	cont hp
cord	cd
cosecant	csc
cosine	cos
cosine of the amplitude, an elliptic function	cn
cost, insurance, and freight	cif
cotangent	cot
coulomb	spell out
counter electromotive force	cemf
cubic	cu
cubic centimeter	cu cm, cm³ (liquid, meaning milliliter, ml)
cubic foot	cu ft
cubic feet per minute	cfm
cubic feet per second	cfs
cubic inch	cu in.
cubic meter	cu m or m³
cubic micron	cu μ or μ³
cubic millimeter	cu mm or mm³
cubic yard	cu yd
current density	spell out
cycles per second	spell out or c
cylinder	cyl
day	spell out
decibel	db
degree	deg or °
degree centigrade	C
degree Fahrenheit	F
degree Kelvin	K
degree Réaumur	R
delta amplitude, an elliptic function	dn
diameter	diam
direct-current (as adjective)	d-c
dollar	$
dozen	doz
dram	dr

* [illegible]

efficiency	eff
electric	elec
electromotive force	emf
elevation	el
equation	eq
external	ext
farad	spell out or f
feet board measure (board feet)	fbm
feet per minute	fpm
feet per second	fps
fluid	fl
foot	ft
foot-candle	ft-c
foot-Lambert	ft-L
foot-pound	ft-lb
foot-pound-second (system)	fps
foot-second (see cubic feet per second)	
franc	fr
free aboard ship	spell out
free alongside ship	spell out
free on board	fob
freezing point	fp
frequency	spell out
fusion point	fnp
gallon	gal
gallons per minute	gpm
gallons per second	gps
grain	spell out
gram	g
gram-calorie	g-cal
greatest common divisor	gcd
haversine	hav
hectare	ha
henry	h
high-pressure (adjective)	h-p
hogshead	hhd
horsepower	hp
horsepower-hour	hp-hr
hour	hr
hour (in astronomical tables)	h
hundred	C
hundredweight (112 lb)	cwt
hyperbolic cosine	cosh
hyperbolic sine	sinh
hyperbolic tangent	tanh
inch	in
inch-pound	in-lb
inches per second	ips
indicated horsepower	ihp
indicated horsepower-hour	ihp-hr
inside diameter	ID
intermediate-pressure (adjective)	i-p
internal	int
joule	j

kilocalorie	kcal
kilocycles per second	kc
kilogram	kg
kilogram-calorie	kg-cal
kilogram-meter	kg-m
kilograms per cubic meter or kg/m³	kg per cu m
kilograms per second	kgps
kiloliter	kl
kilometer	km
kilometers per second	kmps
kilovolt	kv
kilovolt-ampere	kva
kilowatt	kw
kilowatthour	kwhr
lambert	L
latitude	lat or ϕ
least common multiple	lcm
linear foot	lin ft
liquid	liq
lira	spell out
liter	l
logarithm (common)	log
logarithm (natural)	$\log_e$ or ln
longitude	long or λ
low-pressure (as adjective)	l-p
lumen	l
lumen-hour	l-hr
lumens per watt	lpw
mass	spell out
mathematics (ical)	math
maximum	max
mean effective pressure	mep
mean horizontal candlepower	mhcp
megacycle	spell out
megohm	spell out
melting point	mp
meter	m
meter-kilogram	m-kg
mho	spell out
microampere	μa or mu a
microfarad	μf
microinch	μin
micromicrofarad	$\mu\mu$f
micromicron	$\mu\mu$ or mu mu
micron	μ or mu
microvolt	μv
microwatt	μw or mu w
mile	spell out
miles per hour	mph
miles per hour per second	mphps
milliampere	ma
milligram	mg
millihenry	mh
millilambert	mL
milliliter	ml

millimeter	mm
millimicron	mμ or m mu
million	spell out
million gallons per day	mgd
millivolt	mv
minimum	min
minute	min
minute (angular measure)	′
minute (time) (in astronomical tables)	m
mole	mol
molecular weight	mol wt
month	spell out
National Electrical Code	NEC
ohm	spell out or Ω
ohm-centimeter	ohm-cm
ounce	oz
ounce-foot	oz-ft
ounce-inch	oz-in
outside diameter	OD
parts per million	ppm
peck	pk
penny (nails)	d
pennyweight	dwt
per	(see fundamental rules)
percent	spell out
pint	pt
potential	spell out
potential difference	spell out
pound	lb
pound-foot	lb-ft
pound-inch	lb-in
pound sterling	£
pound per brake horsepower-hour	lb per bhp-hr
pound per cubic foot	lb per cu ft
pounds per square foot	psf
pounds per square inch	psi
pounds per square inch absolute	psia
power factor	spell out or pf
quart	qt
radian	spell out
reactive kilovolt-ampere	kvar
reactive volt-ampere	var
revolutions per minute	rpm
revolutions per second	rps
rod	spell out
root mean square	rms
secant	sec
second	sec
second (angular measure)	″
second-foot (see cubic feet per second)	
second (time) (in astronomical tables)	s
shaft horsepower	shp
shilling	s
sine	sin
sine of the amplitude, an elliptic function	sn
specific gravity	sp gr
specific heat	sp ht
spherical candle power	scp
square	sq
square centimeter	sq cm or cm²
square foot	sq ft
square inch	sq in
square kilometer	sq km or km²
square meter	sq m or m²
square micron	sq μ or sq mu or μ²
square millimeter	sq mm or mm²
square root of mean square	rms
standard	std
stere	s
tangent	tan
temperature	temp
tensile strength	ts
thousand	M
thousand foot-pounds	kip-ft
thousand pound	kip
ton	spell out
ton-mile	spell out
versed sine	vers
volt	v
volt-ampere	va
volt-coulomb	spell out
watt	w
watthour	whr
watts per candle	wpc
week	spell out
weight	wt
yard	yd
year	yr

UNITS OF WEIGHT AND MEASURE

(Courtesy National Bureau of Standards)

1. LENGTH

Fundamental Units

A meter (m) is a unit of length equal to the distance between the defining lines on the International Prototype Meter when this standard is at the temperature of melting ice (0° C).

A yard (yd) is a unit of length equal to $\frac{3600}{3937}$ of a meter.

Multiples and Submultiples

1 kilometer (km) = 1 000 meters
1 hectometer (hm) = 100 meters
1 dekameter (dkm) = 10 meters
1 decimeter (dm) = 0.1 meter
1 centimeter (cm) = 0.01 meter
1 millimeter (mm) = 0.001 meter
1 micron (μ) = 0.000 001 meter = 0.001 millimeter
1 millimicron ($m\mu$) = 0.000 000 001 meter = 0.001 micron
1 angstrom (A) = 0.000 000 1 millimeter = .000 1 micron = .1 millimicron.
1 statute mile = 8 furlongs = 320 rods = 1 760 yards = 5 280 feet
1 furlong = ⅛ mile = 40 rods = 220 yards = 660 feet
1 rod = 5½ yards = 16½ feet = 25 links.
1 foot = ⅓ yard = 12 inches.
1 hand = 4 inches
1 inch = 1/36 yard = 1/12 foot.
1 line (button) = 1/40 inch
1 point (printers) = 1/72 inch.
1 mil = 1/1000 inch
1 chain (Gunter's) = 4 rods = 22 yards = 66 feet = 100 links
1 link (Gunter's) = 1/100 chain = 7.92 inches.
1 U. S. nautical mile, 1 sea mile, 1 geographical mile = 1 853.248 meters = 6 080.20 feet.
1 international nautical mile = 1 852 meters = 6 076.10 feet.
1 fathom = 6 feet = 8 spans
1 span = ⅛ fathom = 9 inches.

2. AREA

Fundamental Units

A square meter (m^2) is a unit of area equal to the area of a square the sides of which are 1 meter.

A square yard (sq yd) is a unit of area equal to the area of a square the sides of which are 1 yard.

Multiples and Submultiples

1 square kilometer (km^2) = 1 000 000 square meters
1 hectare (ha), or square hectometer (hm^2) = 10 000 square meters

1 are (a), or square dekameter (dam²) = 100 square meters.
1 centiare (ca) = 1 square meter.
1 square decimeter (dm²) = 0.01 square meter.
1 square centimeter (cm²) = 0.0001 square meter.
1 square millimeter (mm²) = 0.000001 square meter.
1 square mile (sq mi) {= 640 acres = 102 400 square rods. = 3 097 600 square yards = 27 878 400 square feet.
1 acre (acre) = 10 square chains {= 160 square rods = 4 840 square yards. = 43 560 square feet.
1 square chain (sq ch) {= 16 square rods = 484 square yards = 4 356 square feet. = 10 000 square links.
1 square link (sq li) {= 0.0001 square chain = 0.0484 square yard. = 0.4356 square foot = 62.7264 square inches.
1 square rod (sq rd) = 30.25 square yards = 272.25 square feet = 625 square links.
1 square foot (sq ft) = 1/9 square yard = 144 square inches.
1 square inch (sq in) = 1/1296 square yard = 1/144 square foot.

3. VOLUME

Fundamental Units

A cubic meter (m³) is a unit of volume equal to a cube the edges of which are 1 meter.

A cubic yard (cu yd) is a unit of volume equal to a cube the edges of which are 1 yard.

Multiples and Submultiples

1 cubic kilometer (km³) = 1 000 000 000 cubic meters.
1 cubic hectometer (hm³) = 1 000 000 cubic meters.
1 cubic dekameter (dam³) = 1 000 cubic meters.
1 stere (s) = 1 cubic meter.
1 cubic decimeter (dm³) = 0.001 cubic meter.
1 cubic centimeter (cm³) = 0.000 001 cubic meter = 0.001 cubic decimeter.
1 cubic millimeter (mm³) = 0.000 000 001 cubic meter = 0.001 cubic centimeter.
1 cubic foot (cu ft) = [illegible] cubic yard.
1 cubic inch (cu in) = [illegible] cubic yard = [illegible] cubic foot.
1 [illegible] = [illegible] cubic [illegible] = [illegible] cubic [illegible].
1 [illegible].

4. CAPACITY

Fundamental Units

[illegible]

[illegible]

[illegible]

Multiples and Submultiples

[illegible]

[illegible]

1 milliliter (ml) = 0.001 liter = 1.000 027 cubic centimeters.
1 liquid quart (liq qt) = $\frac{1}{4}$ gallon = 57.75 cubic inches.
1 liquid pint (liq pt) = $\frac{1}{8}$ gallon = $\frac{1}{2}$ liquid quart = 28.875 cubic inches.
1 gill (gi) = $\frac{1}{32}$ gallon = $\frac{1}{4}$ liquid pint = 7.218 75 cubic inches.
1 fluid ounce (fl oz) = $\frac{1}{128}$ gallon = $\frac{1}{16}$ liquid pint.
1 fluid dram (fl dr) = $\frac{1}{8}$ fluid ounce = $\frac{1}{128}$ liquid pint.
1 minim (min *or* ♏) = $\frac{1}{60}$ fluid dram = $\frac{1}{480}$ fluid ounce.
1 peck (pk) = $\frac{1}{4}$ bushel = 537.605 cubic inches.
1 dry quart (dry qt) = $\frac{1}{32}$ bushel = $\frac{1}{8}$ peck = 67.200 625 cubic inches.
1 dry pint (dry pt) = $\frac{1}{64}$ bushel = $\frac{1}{2}$ dry quart = 33.600 312 5 cubic inches.
1 barrel, for fruits, vegetables, and other dry commodities, other than cranberries,[9] = 7 056 cubic inches = 105 dry quarts.
1 barrel for cranberries = 5 826 cubic inches.[9]

5. MASS

Fundamental Units

A kilogram (kg) is a unit of mass equal to the mass of the International Prototype Kilogram.

A gram (g) is a unit of mass equal to one-thousandth of the mass of the International Prototype Kilogram.

An avoirdupois pound (lb avdp) is a unit of mass equal to 0.453 592 427 7 kilogram.

A troy pound (lb t) is a unit of mass equal to $\frac{5760}{7000}$ of that of the avoirdupois pound.

Multiples and Submultiples

1 metric ton (t) = 1 000 kilograms.
1 hectogram (hg) = 100 grams.
1 dekagram (dkg) = 10 grams.
1 decigram (dg) = 0.1 gram.
1 centigram (cg) = 0.01 gram.
1 milligram (mg) = 0.001 gram.
1 metric carat[10] (c) = 200 milligrams = 0.2 gram.
1 avoirdupois ounce (oz avdp) = $\frac{1}{16}$ avoirdupois pound = 437.5 grains.
1 avoirdupois dram (dr avdp) = $\frac{1}{256}$ avoirdupois pound = $\frac{1}{16}$ avoirdupois ounce.
1 grain (grain) = $\frac{1}{7000}$ avoirdupois pound = $\frac{1}{5760}$ troy pound.
1 apothecaries' pound (lb ap) = 1 troy pound = $\frac{5760}{7000}$ avoirdupois pound.
1 apothecaries' or troy ounce (oz ap *or* ℥, oz t) = $\frac{1}{12}$ troy pound = $\frac{480}{7000}$ avoirdupois pound = 480 grains.
1 apothecaries' dram (dr ap *or* ʒ) = $\frac{1}{96}$ apothecaries' pound = $\frac{1}{8}$ apothecaries' ounce = 60 grains.
1 pennyweight (dwt) = $\frac{1}{20}$ troy ounce = 24 grains.
1 apothecaries' scruple (s ap *or* ℈) = $\frac{1}{3}$ apothecaries' dram = 20 grains.
1 short hundredweight (sh cwt) = 100 avoirdupois pounds.
1 long hundredweight (l cwt) = 112 avoirdupois pounds.
1 short ton (sh tn) = 2 000 avoirdupois pounds.
1 long ton (l tn) = 2 240 avoirdupois pounds.

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[8] As fixed by [illegible]
[9] As computed [illegible]
[10] See Bureau of [illegible] carats to the [illegible]

TEMPERATURE INTERCONVERSION TABLES

Conversion table degrees centigrade to degrees Fahrenheit

°C	0	10	20	30	40	50	60	70	80	90
	F	F	F	F	F	F	F	F	F	F
−200	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
−100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
−0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	158	[illegible]	[illegible]
100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
200	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
300	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
400	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
600	[illegible]	[illegible]	1148	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
700	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
800	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
900	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1200	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1300	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1400	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1600	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1700	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1800	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1900	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2200	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2300	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2400	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2600	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2700	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2800	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2900	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
°C	0	10	20	30	40	50	60	70	80	90

°C	°F
1	[illegible]
2	[illegible]
3	[illegible]
4	[illegible]
5	9.0
6	[illegible]
7	12.6
8	14.4
9	[illegible]
10	18.0

°F	°C
1	[illegible]
2	[illegible]
3	[illegible]
4	[illegible]
5	[illegible]
6	[illegible]
7	[illegible]
8	[illegible]
9	[illegible]
10	[illegible]
11	[illegible]
12	[illegible]
13	[illegible]
14	[illegible]
15	[illegible]
16	[illegible]
17	[illegible]
18	[illegible]

[illegible]

[illegible]

Conversion table degrees Fahrenheit to degrees centigrade

(Single bold-face figures indicate recurring decimals)

°F	0	10	20	30	40	50	60	70	80	90
	C	C	C	C	C	C	C	C	C	C
−400	−240.0	−245.5	−251.1	−256.6	−262.2	−267.7				
−300	−184.4	−190.0	−195.5	−201.1	−206.6	−212.2	−217.7	−223.3	−228.8	−234.4
−200	−128.8	−134.4	−140.0	−145.5	−151.1	−156.6	−162.2	−167.7	−173.3	−178.8
−100	−73.3	−78.8	−84.4	−90.0	−95.5	−101.1	−106.6	−112.2	−117.7	−123.3
−0	−17.7	−23.3	−28.8	−34.4	−40.0	−45.5	−51.1	−56.6	−62.2	−67.7
0	−17.7	−12.2	−6.6	−1.1	+4.4	+10.0	+15.5	+21.1	+26.6	+32.2
100	37.7	43.3	48.8	54.4	60.0	65.5	71.1	76.6	82.2	87.7
200	93.3	98.8	104.4	110.0	115.5	121.1	126.6	132.2	137.7	143.3
300	148.8	154.4	160.0	165.5	171.1	176.6	182.2	187.7	193.3	198.8
400	204.4	210.0	215.5	221.1	226.6	232.2	237.7	243.3	248.8	254.4
500	260.0	265.5	271.1	276.6	282.2	287.7	293.3	298.8	304.4	310.0
600	315.5	321.1	326.6	332.2	337.7	343.3	348.8	354.4	360.0	365.5
700	371.1	376.6	382.2	387.7	393.3	398.8	404.4	410.0	415.5	421.1
800	426.6	432.2	437.7	443.3	448.8	454.4	460.0	465.5	471.1	476.6
900	482.2	487.7	493.3	498.8	504.4	510.0	515.5	521.1	526.6	532.2
1000	537.7	543.3	548.8	554.4	560.0	565.5	571.1	576.6	582.2	587.7
1100	593.3	598.8	604.4	610.0	615.5	621.1	626.6	632.2	637.7	643.3
1200	648.8	654.4	660.0	665.5	671.1	676.6	682.2	687.7	693.3	698.8
1300	704.4	710.0	715.5	721.1	726.6	732.2	737.7	743.3	748.8	754.4
1400	760.0	765.5	771.1	776.6	782.2	787.7	793.3	798.8	804.4	810.0
1500	815.5	821.1	826.6	832.2	837.7	843.3	848.8	854.4	860.0	865.5
1600	871.1	876.6	882.2	887.7	893.3	898.8	904.4	910.0	915.5	921.1
1700	926.6	932.2	937.7	943.3	948.8	954.4	960.0	965.5	971.1	976.6
1800	982.2	987.7	993.3	998.8	1004.4	1010.0	1015.5	1021.1	1026.6	1032.2
1900	1037.7	1043.3	1048.8	1054.4	1060.0	1065.5	1071.1	1076.6	1082.2	1087.7
2000	1093.3	1098.8	1104.4	1110.0	1115.5	1121.1	1126.6	1132.2	1137.7	1143.3
2100	1148.8	1154.4	1160.0	1165.5	1171.1	1176.6	1182.2	1187.7	1193.3	1198.8
2200	1204.4	1210.0	1215.5	1221.1	1226.6	1232.2	1237.7	1243.3	1248.8	1254.4
2300	1260.0	1265.5	1271.1	1276.6	1282.2	1287.7	1293.3	1298.8	1304.4	1310.0
2400	1315.5	1321.1	1326.6	1332.2	1337.7	1343.3	1348.8	1354.4	1360.0	1365.5
2500	1371.1	1376.6	1382.2	1387.7	1393.3	1398.8	1404.4	1410.0	1415.5	1421.1
2600	1426.6	1432.2	1437.7	1443.3	1448.8	1454.4	1460.0	1465.5	1471.1	1476.6
2700	1482.2	1487.7	1493.3	1498.8	1504.4	1510.0	1515.5	1521.1	1526.6	1532.2
2800	1537.7	1543.3	1548.8	1554.4	1560.0	1565.5	1571.1	1576.6	1582.2	1587.7
2900	1593.3	1598.8	1604.4	1610.0	1615.5	1621.1	1626.6	1632.2	1637.7	1643.3
3000	1648.8	1654.4	1660.0	1665.5	1671.1	1676.6	1682.2	1687.7	1693.3	1698.8
3100	1704.4	1710.0	1715.5	1721.1	1726.6	1732.2	1737.7	1743.3	1748.8	1754.4
3200	1760.0	1765.5	1771.1	1776.6	1782.2	1787.7	1793.3	1798.8	1804.4	1810.0
3300	1815.5	1821.1	1826.6	1832.2	1837.7	1843.3	1848.8	1854.4	1860.0	1865.5
3400	1871.1	1876.6	1882.2	1887.7	1893.3	1898.8	1904.4	1910.0	1915.5	1921.1
3500	1926.6	1932.2	1937.7	1943.3	1948.8	1954.4	1960.0	1965.5	1971.1	1976.6
3600	1982.2	1987.7	1993.3	1998.8	2004.4	2010.0	2015.5	2021.1	2026.6	2032.2
°F	0	10	20	30	40	50	60	70	80	90

°F	°C
1	0.5
2	1.1
3	1.6
4	2.2
5	2.7
6	3.3
7	3.8
8	4.4
9	5.0

EXAMPLES: [illegible]

(Courtesy, National Bureau of Standards)

°F to °C

°F	0	10	20	30	40	50	60	70	80	90
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

°F	°C
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

The Chemical Elements: Their atomic numbers, symbols, and weights, and their melting points on the International Temperature Scale

Temperatures below −190° C are on the Centigrade Thermodynamic Scale.

The atomic weights given constitute the complete list of the International Weights of 1938, as approved and reported by the Committee on Atomic Weights of the International Union of Chemistry. There is reason to believe that the following (unofficial) values may prove more nearly correct: Aluminum, 26.974; carbon, 12.003; gallium, 69.74.

Atomic number	Atomic symbol	Name of element	Melting point °C	Atomic weight
89	Ac	Actinium	* 1600	
13	Al	Aluminum	660.0 ±0.1	26.97
51	Sb	Antimony	630.5 ±0.1	121.76
18	A	Argon	−189.3 ±0.5	39.944
33	As	Arsenic	b 814	74.91
56	Ba	Barium	704 ±20	137.36
4	Be	Beryllium	1280 ±40	9.02
83	Bi	Bismuth	271.3 ±0.1	209.00
5	B	Boron	2300 ±200	10.82
35	Br	Bromine	−7.2 ±0.2	79.916
48	Cd	Cadmium	320.9 ±0.1	112.41
20	Ca	Calcium	850 ±20	40.08
6	C	Carbon	3700 ±100	12.00
58	Ce	Cerium	600 ±50	140.13
55	Cs	Cesium	28 ±2	132.91
17	Cl	Chlorine	−101 ±2	35.457
24	Cr	Chromium	1800 ±50	52.01
27	Co	Cobalt	1490 ±20	58.94
41	Cb	Columbium	2000 ±50	92.91
29	Cu	Copper	1083.0 ±0.1	63.57
66	Dy	Dysprosium	----	162.46
68	Er	Erbium	----	167.64
63	Eu	Europium	----	152.0
9	F	Fluorine	−223 ±10	19.00
64	Gd	Gadolinium	----	157.3
31	Ga	Gallium	29.78 ±0.02	69.72
32	Ge	Germanium	958 ±10	72.60
79	Au	Gold	1063.0 ±0.0	197.2
72	Hf	Hafnium	* 1700	178.6
2	He	Helium	−271.4 ±0.2	4.002
67	Ho	Holmium	----	163.5
	H	Hydrogen	−259.2 ±0.1	1.0078
		H_2 (normal)	−259.2 ±0.1	----
		HD	−256.5 ±0.2	----
		D_2 (normal)	−254.5 ±0.2	----
61	Il	Illinium	----	----
49	In	Indium	156.4 ±0.1	114.76
53	I	Iodine	114 ±1	126.92
77	Ir	Iridium	2454 ±3	193.1
26	Fe	Iron	1535 ±2	55.84
36	Kr	Krypton	−157 ±0.5	83.7
57	La	Lanthanum	826 ±5	138.92
82	Pb	Lead	327.4 ±0.1	207.22
3	Li	Lithium	186 ±5	6.940
71	Lu	Lutecium	----	175.0
12	Mg	Magnesium	650 ±2	24.32
25	Mn	Manganese	1260 ±20	54.93
43	Ma	Masurium	* 2300	
80	Hg	Mercury	−38.87 ±0.02	200.61
42	Mo	Molybdenum	2625 ±50	96.0

Atomic number	Atomic symbol	Name of element	Melting point °C	Atomic weight
60	Nd	Neodymium	840 ±40	144.27
10	Ne	Neon	−248.6 ±0.3	20.183
28	Ni	Nickel	1455 ±1	58.69
7	N	Nitrogen	−210.0 ±0.2	14.008
76	Os	Osmium	2700 ±200	191.5
8	O	Oxygen	−218.8 ±0.3	16.0000
46	Pd	Palladium	1554 ±1	106.7
15	P	Phosphorus, Y	44.1 ±0.1	31.02
		Phosphorus, R	* 590	
78	Pt	Platinum	1773.5 ±1	195.23
84	Po	Polonium	* 600	
19	K	Potassium	63 ±1	39.096
59	Pr	Praseodymium	940 ±50	140.92
91	Pa	Protactinium	* 3000	231
88	Ra	Radium	700	226.05
86	Rn	Radon	−71	222
75	Re	Rhenium	* 3000	186.31
45	Rh	Rhodium	1966 ±3	102.91
37	Rb	Rubidium	39 ±1	85.44
44	Ru	Ruthenium	2500 ±100	101.7
62	Sm	Samarium	>1300	150.43
21	Sc	Scandium	1200	45.10
34	Se	Selenium	220 ±5	78.96
14	Si	Silicon	1420 ±20	28.06
47	Ag	Silver	960.5 ±0.0	107.880
11	Na	Sodium	97.7 ±0.2	22.997
38	Sr	Strontium	770 ±10	87.63
16	S	Sulfur		32.06
		monoclinic	119.2 ±0.2	
		rhombic	112.8 ±0.2	
73	Ta	Tantalum	3000 ±100	180.88
52	Te	Tellurium	450 ±10	127.61
65	Tb	Terbium	327 ±3	159.2
81	Tl	Thallium	300 ±1	204.39
90	Th	Thorium	[illegible] ±150	232.12
69	Tm	Thulium	----	169.4
50	Sn	Tin	231.9 ±0.1	118.70
22	Ti	Titanium	1800 ±100	47.90
74	W	Tungsten	3370 ±20	184.0
92	U	Uranium	[illegible]	238.14
23	V	Vanadium	1710 ±50	50.95
54	Xe	Xenon	−112 ±1	131.3
70	Yb	Ytterbium	----	173.04
39	Y	Yttrium	1490 ±40	88.92
30	Zn	Zinc	419.4 ±0.1	65.38
40	Zr	Zirconium	1700 ±100	91.22
85	----	Element 85	* 300	
87		Element 87	* [illegible]	----

* Computed. b At 36 atmospheres. c At [illegible] atmospheres. d At [illegible]

(Courtesy National Bureau of Standards)

SIGNS, SYMBOLS ETC. ARITHMETICAL, ALGEBRAICAL GEOMETRICAL, etc.

- $+$ plus, the sign of addition also of positive (Elec and Mag), and compression (Eng)
- $-$ minus, the sign of subtraction also of negative (Elec and Mag) and tension (Eng)
- the sign of multiplication
- the sign of division
- is to / as / is to } the signs of proportion. Thus a b c d equal $\frac{a}{b}$ $\frac{c}{d}$
- because
- therefore
- equals the sign of equality
- $\propto$ varies as
- ∞ infinity
- $\sqrt{}$ square root
- $\sqrt[3]{}$ cube root
- $\sqrt[4]{}$ fourth root, etc.
- $\sqrt[n]{}$ nth root
- equals approximately
- is equal to, or is not understood as is congruent
- $>$ is greater than
- $\ngtr$ is not greater than
- $<$ is less than
- $\nless$ is not less than
- [illegible]
- [illegible]
- [illegible]
- angle
- right angle
- [illegible]
- square
- [illegible]
- circle
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

GALV GALVANOMETER

AM AMMETER

VM VOLTMETER

CELL (LONG LINE IS ALWAYS POSITIVE)

BATTERY, MULTI-CELL

CONNECTIONS

NO CONNECTIONS

RESISTOR

RHEOSTAT

POTENTIOMETER

FIXED CAPACITOR

FIXED CAPACITOR (INDUSTRIAL)

VARIABLE CAPACITOR

GROUND CONNECTION

ANTENNA

FUSE

LAMP, ILLUMINATING

PILOT LAMP

M D C MOTOR

G D C GENERATOR

M THREE-PHASE A C MOTOR

G SINGLE-PHASE A C GENERATOR

DIODE, DIRECTLY HEATED CATHODE

TRIODE, INDIRECTLY HEATED CATHODE

TRANSFORMER, AIR CORE

TRANSFORMER IRON CORE

INDUCTOR MAGNETIC CORE

ROTARY SWITCH

KNIFE SWITCH, SPST

KNIFE SWITCH DPST

KNIFE SWITCH, DPDT

PUSHBUTTON SWITCH NORMALLY OPEN

PUSHBUTTON SWITCH, NORMALLY CLOSED

JACK

PLUG

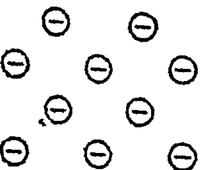
DOUBLE-HEAD SET

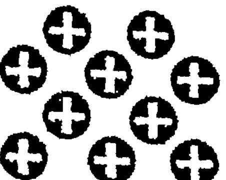
Electrical and radio symbols

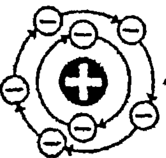
Courtesy, U S Government Printing Office

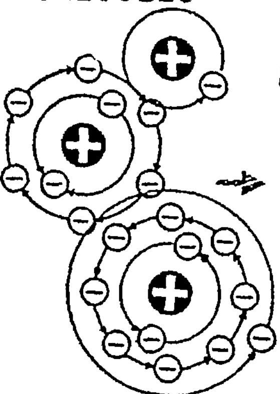
SUMMARY OF A.C. AND D.C. INDUCTION

Action	D.C.	Pulsating D.C.	A.C.
Current direction	Always in one direction	Always in one direction	Changes direction regularly
Current steadiness	Always steady	Rises and falls	Rises and falls
Magnetic fields produced	Build up—then steady as long as current is steady. Always the same direction	Constantly expanding and contracting. Always same direction	Constantly expanding and contracting. Reverse direction regularly
Mutual induction	Occurs only when circuit is opened, closed, or when current value changes. Induced voltage varies in direction depending on [illegible]	Occurs constantly. Varies in direction constantly	Occurs constantly. Varies in direction constantly
Self induction	Occurs only when circuit is opened [illegible]	[illegible]	Occurs constantly. Varies in direction [illegible]











Electricity and matter

Courtesy, U.S. Government Printing Office

ADJUSTMENT FOR SPRING TENSION
PIG TAIL
SPRING FOR BRUSH PRESSURE
BRUSH
BRUSH HOLDER
D

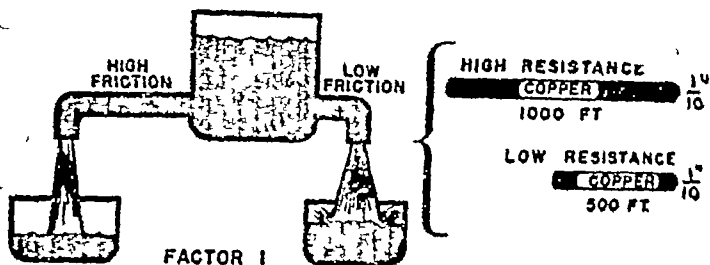
RISERS
MICA
SLOTS FOR COIL LEADS
COMMUTATOR SLEEVE
COPPER SEGMENTS
C

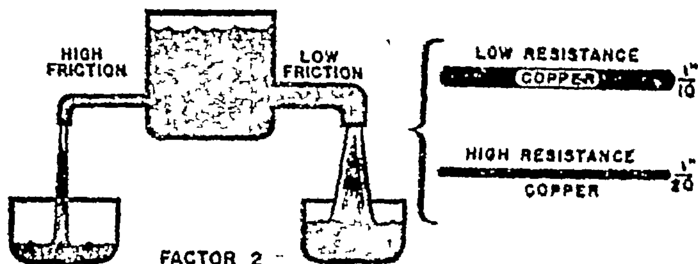
DUCK STRIPS TO PREVENT COILS FROM RUBBING
LEADS TO BE ATTACHED TO COMMUTATOR
FISH PAPER CELLS PROTECT COILS IN SLOTS
BACK CONNECTIONS OF COILS
ARMATURE
B

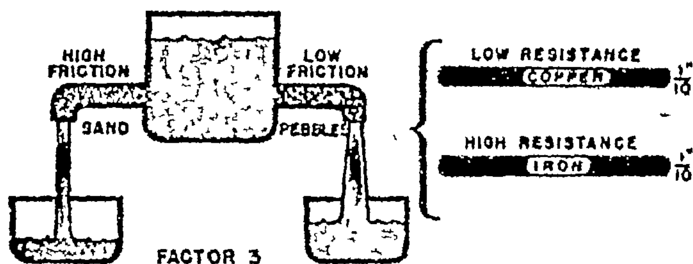
A

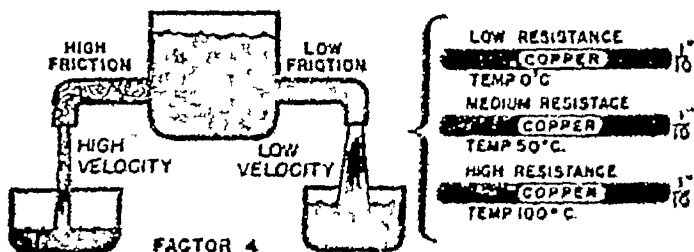
Parts of a generator.

[illegible]









Resistance and current

Courtesy U.S. Government Printing Office

J. 48

BOOK OF FACTS

Edited by

J. D. Sunthankar

BOOK OF FACTS is a useful collection of great educational value Here is the book that will provide you with the most interesting and factual information about everything under the sun. Every page of this wonderful book is densely packed with answers to most frequently asked questions both usual and unusual . . . BOOK OF FACTS will be of immense practical use to everybody

*

J. 49

TREASURY OF WIT AND HUMOUR

J. 50

THE WHIRLWIND

by

Prof N. S. Phadke

The story of the Heroic Struggle that rocked a Mighty Empire to its very foundations.

The dawn of the Twentieth Century saw the awakening of a strong feeling of freedom that galvanised the nation into action, culminating in the heroic 1942 movement --

THE WHIRLWIND, a famous work by Prof. Phadke, draws a vivid picture of this great change which brought about a new phase in our national history

✕

J. 57

THE MOTHER

by

Grazia Deledda

Conscience — Instinct — Conflict

"It was a supreme struggle of the blind instinct of the flesh against the dominion of the spirit . . .

"After a few moments he rose to his feet, uncertain still which of the two had conquered . .

"The mother was conscious of the agony that was raging in the heart of her son, the priest. She lamented, 'Why, Oh Lord, was Paul forbidden to love a woman?'"

J. 60

CHITRALEKHA

by

Bhagwati Charan Verma

translated by

Chandra B. Karki

Her Beauty is Her Power —

Her charm has conquered the heart of everyone. She has overcome many obstacles and finally become the most famous dancer at court. What can withstand the power of her beauty ? But, lo ! a new foe has arisen, the spiritual strength of an ascetic.

Watch this breath-taking struggle between spiritual strength and bodily beauty, the eternal struggle between Good and Evil.

Which one is going to be the victor ?

*

J. 61

TEARS AND LAUGHTER

by

Kahlil Gibran

J. 62

INDIAN COOKERY

by

E. P. Veerasawmy

Here is an authentic, simple and unique book on Indian Cookery written by the foremost Indian chef of the century, Mr Veerasawmy. To prepare tasty meal and dishes for you or for others this book is of real help.

Buy this book and know the secret and fun of good cooking

✕

J. 63

BEL-AMI

by

Guy de Maupassant

Here is the most striking of Maupassant's novels, where the adept story-teller is at his best—wise, witty, exciting and always interesting. Georges Duroy—the principal character—believes that success comes quickest through women, and he uses them in whatever way he likes, but never permits them to have a grip on him.

J. 66

WHAT IS CREATIVE THINKING ?

by

Catharine Patrick

This illuminating book presents all the available information about creative thinking. Within the covers of this book are given the various viewpoints and investigations of many different authors. This is a very instructive book which helps the reader to get a comprehensive view of the whole field of creative thought.

J. 67

x

STORIES FROM BENGAL

by

Dr S Dutt

J. 68

LAUGH WITH LEACOCK

by

Stephen Leacock

So charming are the works of Leacock that every one reads them with profound pleasure. If only the reader knows how much the contemporary writers owe Leacock, he would take it to mind to possess this handy book. Memorable are Irwin S Cobb's words · " . all Leacock stories are favourites of mine How are you going to choose one pearl from a string of perfect pearls ? I love him for the laughs he had made"

x

J. 69

GETTING THE MOST OUT OF LIFE

by

C. G. L. DuCann

You have a Right to Happiness—

"If you have a duty to all-the-rest-of-them, have you no duty to yourself ?

"If all-the-rest-of-them have rights, have you no rights ? The right to health The right to wealth. The right to love .

"And a thousand other minor rights . ."

This book will lead you to the fulfilment of your rights and guide you to get the most out of life.

J. 71

NAPOLEON

by

Emil Ludwig

This book is the story of that spectacular figure in history, that dauntless general who kept Europe in eternal fear, that extraordinary man of extraordinary genius—Napoleon . This classic of a book gives all possible details about the great general's military strategy, his colourful love affairs and all his megalomaniac dreams which, alas, could not be realised . You cannot forget that it is an outstanding book on an outstanding man

*

J. 71

THE VICAR OF WAKEFIELD

by

Oliver Goldsmith

J. 52

GODAN

by

Premchand

(A Novel of Peasant India)

Translated by

Jai Ratan and P. Lal

Premchand is unsurpassed in his mastery over the depiction of life of peasant masses of India His writings are deep, artistic and true and above all, they open out a panorama of Indian life

"Nervous like a knife, he cuts clear through hypocrisy and falsehood in his last novel GODAN, so that this work throws up strongly contrasted characters seldom seen in any previous book of his, surpassing the chaos of the still feudal village with its courageous belief in future renewal"

—**Dr. Mulk Raj Anand**

⌘

J. 72

JATAKA TALES

Selected and Edited by

H. T. Francis & E. J. Thomas

Buddha preached his teachings in simple language and examples so that they could be easily understood by high and low, by literates and illiterates alike. Jataka Tales are such parables told in simple language to the peasants by **THE MASTER.** These stories are full of wisdom, knowledge and moral lessons.

The present selection has been made with the purpose of bringing together the Jataka Stories of most interest, both intrinsically, and also from the point of view of the folk lore

J. 75

ONE THOUSAND NIGHTS ON A BED OF STONES AND OTHER STORIES

by

K. A. Abbas

The prolific Indian writer who gave . . AND ONE WHO DID NOT COME BACK, OUTSIDE INDIA, INQILAB and a host of other books, here now offers this collection of absorbing short stories to the reading public.

These good stories are exceptionally amusing, witty, soul-moving and gripping. As we read them multitudes of unforgettable characters crowd the gallery of our mind with their smiles, wiles and guiles, platitudes, snobberies, suffering, sorrow and pain.

The portrayal is so vivid that we are unwilling to believe that the characters are only imaginary ones.

*

J. 76

YOUR MIND AND HOW TO USE IT

by

W. J. Ennever

J. 77

SOME INNER FURY

by

Kamala Markandaya

Kamala Markandaya's first novel NECTAR IN A SIEVE (also in Jaico Series) was an outstanding success . . . and **similar is the case with the present one.**

The scene of this novel is colourful India, and the time those momentous days of travail out of which the new India is born.

This novel, at once a brilliant and exciting exposition of India, has an indescribable charm that the reader will feel sorry that he has finished reading it



J. 78

LOVE AND MR. LEWISHAM

by

H. G. Wells

This is one of the best novels written by Wells Besides its story interest this novel sheds a flood of light on Well's first acquaintance with love. Mr. Lewisham and Ethel met for the first time and ever afterwards their sweet interviews followed. Whether or not love is blind, Mr Lewisham had the first taste of it after which he surrendered to its overwhelming power. Having tasted those sweet doses of love he concludes that love is the greatest of all things.

The reader will see that this novel makes delightful reading.

J. 79

THE SPELL OF APHRODITE AND OTHER STORIES

by

S. K. Chettur

To Indian readers Chettur is well-known through his many absorbing short stories and his murder-mystery novel which had appeared in various Indian journals.

Here is a collection of very interesting short stories each betraying the writer's penetrating observation and gifts of imagination. His charming characters come and go making lasting impressions in our mind.

All these stories, without any exception, have remarkable qualities to make them very much appealing to readers of a wide range.

J. 80

TALES FROM KALIDASA

by

Suna K. Sunegar

J. 81

THE FIRST MEN IN THE MOON

by

H. G. Wells

If the good reader is in search of some novel that thrills, stirs, and enthralls, here it is. Not only that. It can make you think a little too

THE FIRST MEN IN THE MOON presents an amazing and thought-provoking adventure of the first men in the moon. Through the caves and corridors inside the moon, these men force their way with dauntless spirit, undying courage and unquenchable thirst for adventure

This novel of scientific fantasy provides for the reader an endless series of entertainments

x

J. 84

THROUGH THE JUNGLES OF BRAZIL

by

Tibor Sekelj

The tempting pages of this book bring to light the thrilling real life adventures of Tibor Sekelj in the Jungles of Brazil . All that he writes in this read like an incredible fairy tale.

This book of thrilling adventure will amuse readers of different walks of life. To the student and the anthropologist it is a mine of information regarding fauna and flora. To the seeker of adventure it is an extra thriller. To the general reader it is almost a graceful novel of compelling interest written in graceful language.

J 36.

THE JUNGLE

by

Upton Sinclair

A novel that casts a lurid light on the disgraceful condition of the Chicago meat packing industry and the deplorable plight of the workers is THE JUNGLE.

This novel was the best seller in the United States and Great Britain and now its popular appeal is ever on the increase everywhere [illegible]. This book was instrumental for [illegible] in improving meat packing methods.

Remember that many many readers have already read, are reading it. Thus there is no reason why you should not read it.

*

J-37

LAUGHTER AND APPLAUSE

by

Alan M. Laing

JAICO BOOKS

J 1 RUBAIYAT OF OMAR KHAYYAM—Edward FitzGerald
J 2 MOTHER—Maxim Gorky
J 3 PANCHATANTRA—Arthur W. Ryder
J 4 LIGHT OF ASIA AND THE INDIAN SONG OF SONGS —Sir Edwin Arnold
J 5 DROLL STORIES—Balzac
J 6 THE VISION OF INDIA—Sisirkumar Mitra
J 7 AMONG THE GREAT—Dilip Kumar Roy
J 8 MY CHILDHOOD—Maxim Gorky
J 9 MY UNIVERSITIES—Maxim Gorky
J 10 IN THE WORLD—Maxim Gorky
J 11 FOUR GREAT HISTORICAL PLAYS OF—William Shakespeare
J 12 FOUR GREAT TRAGEDIES OF—William Shakespeare
J 13 FOUR GREAT COMEDIES OF—William Shakespeare
J 14 WUTHERING HEIGHTS—Emily Bronte
J 15 A TALE OF TWO CITIES—Charles Dickens
J 16 PRIDE AND PREJUDICE—Jane Austen
J 17 THE GREAT SHORT STORIES—Guy de Maupassant
J 18 NANA—Emile Zola
J 19 ANNA KARENINA—Leo Tolstoy
J 20 THE LIBERATOR—Sisirkumar Mitra
J 21 EMMA—Jane Austen
J 22 HE WHO RIDES A TIGER—Bhabhani Bhattacharya
J 22 INQILAB—Khwaja Ahmad Abbas
J 24 THE SUBSTANCE OF A DREAM—F. W Bain
J 25 THE NATIONAL CULTURE OF INDIA—Dr S Abid Husain
J 26 THE GOLDEN BOAT—Rabindranath Tagore
J 27 NECTAR IN A SIEVE—Kamala Markandaya
J 28 SOMADEVA'S VETALAPANCHAVIMSATI—C H Tawney
J 29 CASANOVA'S MEMOIRS—Joseph Monet
J 30 CAMILLE—Alexandre Dumas
J 31 OUR HEARTS—Guy de Maupassant
J 32 MADEMOISELLE de MAUPIN—Theophile Gautier
J 33 THE WISDOM OF INDIA—Lin Yutang
J 34 A DIGIT OF THE MOON AND A DRAUGHT OF THE BLUE —F W Bain
J 35 UNTOUCHABLE—Mulk Raj Anand
J 36 THE LIVING THOUGHTS OF GOTAMA THE BUDDHA—Ananda K. Coomaraswami and I B Horner
J 37 THAIS—Anatole France
J 38 SENSE AND SENSIBILITY—Jane Austen
J 39 SOMADEVA'S KATHASARITSAGARA—C H Tawney
J 40 CREATURES OF DESTINY—S Muzumdar
J 41 MAHATMA GANDHI. ESSAYS AND REFLECTIONS —Edited by Dr S. Radhakrishnan

J 42 FAREWELL MY FRIEND & THE GARDEN—Rabindranath Tagore
J 43 THE ART OF LIVING—Prof. T. K. [illegible]
J 44 ECONOMICS IN ONE LESSON—Henry Hazlitt
J 45 YOU MUST RELAX—E. Jacobson
J 46 THE PROFESSOR—Charlotte Bronte
J 47 THE WISDOM OF CHINA—Lin Yutang
J 48 BOOK OF FACTS
J 49 TREASURY OF WIT & HUMOUR
J 50 THE WHIRLWIND—[illegible]
J 51 SIDDHARTHA—MAN OF PEACE—Harindranath Chattopadhyaya
J 52 [illegible]
J 53 [illegible] KADAMBARI—C. M. Ridding
J 54 THE LIVING THOUGHTS OF CONFUCIUS—Alfred Doeblin
J 55 THE LIVING THOUGHTS OF KARL MARX—Leon Trotsky
J 56 THE LIVING THOUGHTS OF VOLTAIRE—Andre Maurois
J 57 [illegible]
J 58 THE [illegible] STORY BOOK OF LEO TOLSTOY'S WAR & PEACE [illegible]
J 59 [illegible]
J 60 [illegible]
J 61 [illegible]
J 62 [illegible]
J 63 [illegible]
J 64 [illegible]
J 65 [illegible]
J 66 [illegible]
J 67 STORIES FROM BENGAL—[illegible]
J 68 [illegible]
J 69 [illegible]
J 70 [illegible]
J 71 [illegible]
J 72 [illegible]
J 73 [illegible]
J 74 [illegible]
[illegible]